RAILWAY Mechanical and Electrical Engineer

Mechanical Division Annual Meeting—An Appreciation

In a number of respects, the 26th annual meeting of the A. A. R. Mechanical Division at San Francisco, June 24 to 26, inclusive, was a marked success, notably from the points of view of attendance, highly constructive addresses including two by railroad presidents, generally condensed presentation of committee reports, more discussion than usual and participation of younger men in the proceedings. An unexpected and much appreciated feature was a moving picture, presented at the beginning of one of the afternoon sessions, which showed record-breaking snow conditions in the Sierra Nevada and other western mountains last winter and how railroads used equipment and men to overcome these conditions.

One thing which added greatly to the value of the sessions was the fact that all five of the major speakers largely avoided generalities, platitudes and complaints about subsidized competition and, instead, devoted themselves to fairly specific problems which mechanical officers must solve in the interests of improved service.

Registration at the San Francisco meeting showed an attendance of about 381 railroad men, 41 private car company representatives, 36 others, or a total of 456 railroad men. This may be compared (and favorably) with the 358 railway supply men in attendance who thus for the first time in recent years were surprised to find themselves outnumbered at a meeting of this kind. The Southern Pacific alone sent 205 men to the meetings on various days and the average attendance at each of the six sessions has been estimated at 600. A tribute to the interest in the proceedings and the effectiveness of Chairman B. F. Brown as a presiding officer is afforded by the discussions which waxed quite spirited at times and by the small number of men who failed to sit through until conclusion of each of the business sessions.

Special attention may well be centered on the address of F. B. Whitman, president, Western Pacific, as abstracted elsewhere in this issue. He confined his remarks almost exclusively to the need for employee training, development of competent supervisors and the general importance of human relations in mechanical department work. In fact he suggested that the Mechanical Division take specific steps in this direction by appointing a committee to study and report on various phases of the matter.

Similarly, D. J. Russell, president, Southern Pacific, delivered himself of some equally potent remarks about research, such as: "We live in a new era of research. Only those that are ahead by research will be ahead at the finish line."

The vast amount of present railroad research, most of it unseen by the general public, was described by Mr. Russell with the comment that it is not enough. He mentioned the Central Research Laboratory of the A. A. R. at Chicago; the various research projects farmed out to research institutes by the railroads; research continually carried on by the railroad supply industries, and the never ending research on the railroads themselves, which constitute "a laboratory more than 220,000 miles long for the invention and testing of improvements in plant and equipment and in methods and services, tested under actual service conditions."

"I would like every railroader to be proud of what has been accomplished, but at the same time not be satisfied. We must engage in railroad research more vigorously, and with more imagination. There are always better, undiscovered ways of doing any job, and better kinds of equipment with which to do it. We've got to keep improving if we expect to keep up with the parade. Research is the answer."

Discussing subjects of interest to his audience of experts on railroad motive power and cars, Mr. Russell mentioned the possibility of improving the air conditioning of trains, easing the ride of freight cars, perfecting the design of box cars, investigating the possible use of containers, speeding cars through freight yards, eliminating bearing failures, further standardizing of equipment and parts, and learning how to get more horsepower out of low-grade fuels.

Mechanization has made railroading jobs easier, and its long range effect is to attract more business and create more jobs, according to Mr. Russell who said: "Railroad men and women have a better understanding today than ever before that their interests and those of their company are tied together. They know that permanent well being for employees depends on railroads handling a large volume of traffic and making reasonable profits. They know that excessive labor costs will raise freight rates and drive business to competitors, thereby reducing railroad jobs."

Many forward-looking railway men will go along with Mr. Russell's concluding thought that practical mechanical officers especially should encourage, urge and insist on modern research in railroad business, since it is only by intensified research that this country can, first, protect itself and, second, find ways to do things better and easier, and thus release people and resources for a higher standard of living.

West Coast Mechanical Division Meeting Attended by Over 800

The perennial problems of hot boxes, diesel wheels and derailments due to mechanical causes were discussed and several suggestions made for broadening the interest of future meetings

REPRESENTATIVES of 80 railroads from all sections of North America, with an especially large attendance from the Pacific Coast roads, contributed to the success of the Mechanical Division meeting held at the Fairmont Hotel, San Francisco, June 24 to 26 inclusive.

There were 17 technical reports on the program. Less time was devoted to presentation and more time to discussion than has been the custom during past years. Eleven of the 17 reports were discussed.

Addresses were made by the presidents of two Pacific Coast railroads, D. J. Russell, of the Southern Pacific, and F. B. Whitman, of the Western Pacific. There were three other speakers: W. J. Patterson, member of the Interstate Commerce Commission; E. H. Davidson, director of the Bureau of Locomotive Inspection, I.C.C., and L. L. Adams, manager, transportation planning, United States Steel Company. All dealt specifically with matters with which the members of the Mechanical Division are concerned. Mr. Adams told how freight cars look to a steel shipper and made specific suggestions for better meeting the needs of the steel industry.

Mr. Russell, in his address at the opening session, challenged the railroads to do more than what research and the urge to develop better equipment and better ways of doing things already have accomplished on American railroads. "There are always better undiscovered ways of doing any job," he said, "and better kinds of equipment with which to do it. We must engage more vigorously and with more imagination in railroad research—in laboratories or on the job—striving to find better and more efficient ways of serving the public."

The following pages include other addresses and committee reports which are of general interest. The officers elected for 1952-1953 appear on page 59.

General Committee of the Mechanical Division in its meeting room at the Fairmont Hotel, San Francisco on Monday, June 23. Left to right: J. A. Gower, assistant mechanical engineer, Pennsylvania; L. B. George, assistant chief of motive power and rolling stock, Canadian Pacific, alternate for W. A. Newman, chief of motive power and rolling stock; F. K. Stremmel, assistant secretary; J. L. Carver, mechanical and research engineer, Illinois Central, alternate for A. G. Kann, general superintendent equipment; Fred Peronto, secretary; W. M. Keller, director of mechanical research; V. R. Hawthorne, executive vice-chairman; B. M. Brown, general superintendent motive power, Southern Pacific, chairman; H. T. Cover, assistant vice-president and chief of motive power, Pennsylvania, vice-chairman; D. S. Newhart, general superintendent motive power, Union Pacific; J. P. Morris, general manager, mechanical department, Atchinson, Topeka & Santa Fe; F. K. Mitchell, manager equipment, New York Central system; M. R. Brockman, assistant vice-president, Southern; F. H. Einwaechter, chief engineer, motive power and equipment, Baltimore & Ohio, alternate for A. K. Galloway, general superintendent motive power and equipment; and C. E. Pond, assistant to superintendent motive power, Norfolk & Western, alternate for R. G. Henley, who is general superintendent motive power.

Address by Chairman Brown

Chairman B. M. Brown welcomed the A. A. R. Mechanical Division to San Francisco and expressed the opinion that it is a good idea to hold annual meetings occasionally in different parts of the country to stimulate the interest and attendance of many railway men who do not normally get to the meetings. He reviewed the scope and purpose of the Mechanical Division and said:

"We must pay tribute to the work of our standing committees who handle a great amount of detail in addition to their regular work on their own railroad and whose decisions have a pronounced influence on railroad equipment, design, and movement.

"The deliberation of each committee is submitted at the annual meeting in pamphlet form for consideration of the members in attendance and provides the opportunity for those who may not be members of the committee to express themselves.

"Important functions of the Mechanical Division include the Inspection and Research departments. Most of you have come in contact with the field inspectors of the Division who are continually following-up on the ground with railroads and private car owners the observance of the rules covering inspection, maintenance and interchange of equipment.

"Research is of great importance in the improvement of equipment design and performance, and the division is well represented in this field. A centralized laboratory has been established and our efforts in this direction are placed in the hands of a Director of Mechanical Research. The research efforts of the Mechanical Division are coordinated with those of other divisions of the Association through a coordinating committee on physical research, so that the expenditures for research in all lines of railroad endeavors undertaken by the Association will be properly evaluated. Services of independent research organizations are engaged on occasion.

"We must also give credit to the influence of manufacturers of equipment and parts for their contribution to the progress of equipment improvements. These suppliers generally have their own research and engineering organization and are continually striving for perfection. Their personnel is, in many cases, recruited from the ranks of experienced railroad men.

"The discussion of reports is a vital function of the annual meetings. It should be borne in mind that the number of members of any of the committees is somewhat limited and the subject broad. The committees to the best of their ability digest the matters referred to them and make recommendations, or otherwise present their deliberations in these reports. Unless they have a frank discussion at the annual meeting they must naturally assume that their conclusions are acceptable. Comments from those in attendance, whether favorable or otherwise, are valuable to the committee in their further deliberation, as they can be reviewed at subsequent committee meetings.

"In paying tribute to the work of our committees, we cannot say that railroad equipment has reached the state of perfection. We know that competition is getting keener, schedules tighter and equipment failures more costly in claims or loss of business so, as your chairman, I place with you the charge that we must continue our efforts to keep equipment abreast of these more demanding requirements. As mechanical department men that is our primary responsibility."

Election of Officers—
Term Expiring June 1954

H. T. COVER, (chairman), assistant vice-president and chief of motive power, Pennsylvania.

D. S. NEUHART, vice-chairman, general superintendent of motive power and machinery, Union Pacific.

B. M. BROWN, general superintendent of motive power, Southern Pacific.

M. R. BROCKMAN, assistant vice-president, Southern.

A. K. GALLOWAY, general superintendent motive power and equipment, Baltimore & Ohio.

R. G. HENLEY, general superintendent motive power, Norfolk & Western.

J. P. MORRIS, general manager, mechanical department, Atchison, Topeka & Santa Fe.

J. F. RYAN, superintendent machinery, Louisville & Nashville.

J. L. ROBSON, general superintendent motive power, Great Northern, succeeding F. R. Hosack, general superintendent car department, Chicago, Rock Island & Pacific, resigned. Term to expire June 1953.

Research and the Railroads

Mr. Russell, in his address at the opening session, challenged the railroads to do more than what research and the urge to develop better equipment and better ways of doing things already have accomplished on American railroads. But "there are always better undiscovered ways of doing any job," he said, "and better kinds of equipment with which to do it. We must engage more vigorously and with more imagination in railroad research—in laboratories or on the job—striving to find better and more efficient ways of serving the public."

As examples of the need for constant striving for improvement he cited air conditioning, which has been a great boon to the traveler, but needs more research to improve its reliability and to simplify it so that difficulties may be overcome more readily when they occur.

Inspection of freight trains on the Southern Pacific by walking from end to end is being replaced by inspecting rolling trains in yards, using pits, towers, lights, mirrors and other aids. This has made inspection faster and it is done better. Better shock absorption is needed in freight cars. He asserted that, along with specialized cars, more and more of which are being built, there is need from the railroad standpoint, for a car suitable for wider use. Based on an estimate that about one-fifth of the freight moved by railroad can be moved in containers, he advocates that a great deal more research be devoted to that subject. Containers might make box-car protection unncessary.

Mr. Russell also called attention to the fact that freight cars spend about four times as many hours in yards and terminals as in actual service, which means that "if we could reduce the loss of time by 25 per cent, we gain 100 per cent in useful time." "We point with pride to our increase in ton-miles per freight-train hour, calling it our index of operating efficiency," he said, "but we cannot point with pride to our record of car-hours motionless."

Another serious problem to which Mr. Russell referred is the perennial hot box. "Somewhere is the know-

how that will eliminate it," he said. "We wonder if the present conventional journal box assembly and method of lubrication can be continued in use and in practice indefinitely." Research will "find the answer."

Another object of research is standardization of equipment parts, which increases availability and reduces inventories of parts required for maintenance. But, the speaker remarked, "When researchers come up with something better than our standard, we must adopt that new thing as quickly as can practically be done—taking the long view rather than the short one."

As an example of the new problems with which the railroads will continually be faced, Mr. Russell cited present diesel fuel and lubrication difficulties. "Eventually," he said, "I am afraid, the grade of distillate fuel available for railroads will be lowered. And in diesel locomotives the lowering of fuel quality will increase lubrication problems. We must develop efficient engines using lower grades of fuels. The gas turbine may be a development in that direction."

Mr. Russell advocated the use by individual railroads of outside technical research facilities. He told of the experience of the Southern Pacific in a study of the efficiency of fuel consumption on steam locomotives conducted in the railroad's own laboratory with the help of Battelle Memorial Institute. This resulted in saving many times the cost of the investigation, even though not enough to forestall the diesel invasion. The Stanford Research Institute, connected with Stanford University, has also served the Southern Pacific. These organizations, he said, are available to anyone, and he stressed his belief that railroads should not hesitate to use them.

Among the developments which have taken place on the Southern Pacific, of which it is proud, Mr. Russell mentioned the electric baggage elevators on passenger cars to eliminate crowding of vestibules in loading and unloading, derailment safety guides to keep derailed trucks in line, boiler drop plugs to prevent steam-locomotive boiler explosions from low water, gyro-jet oil burners for steam locomotives, and steps to prevent weevil infestation in box cars. He closed with reference to the new Coordinating Committee on Physical Research of the A.A.R. under the direction of Vice-president Aydelott with its membership of three from engineering, three from mechanical, two from test departments and laboratories, and one an expert on containers and freight loading, whose recommendations to Mr. Aydelott will guide policy.

Address by F. B. Whitman

F. B. Whitman, president, Western Pacific, made the opening address on Thursday morning on the general subject: "Importance of Human Relations in the Mechanical Department". He praised the Division for its contribution in improving material standards, but said this is only part of the job which confronts mechanical department officers if they expect to get the maximum results desired by railroad managements.

Elaborating on this point, Mr. Whitman pointed out that engineers, both in industry and railway service, are generally more interested in materials than in people, but that no matter how skilled they become in utilizing material resources efficiently, this effort is largely ineffective without due attention to the human element. He said that railway employees and supervisors are the greatest asset of any railroad, and this is borne out by the fact that wages are the largest item of expense. For low-cost operation, some means must be found to get better results with present forces, or the same work with fewer men.

Mr. Whitman referred to an experiment some years ago in which a group of employees engaged in winding small motors was subjected to improvements in working conditions and particularly in recognition of their ideas and accomplishment, with highly satisfactory results in increased production. He maintained that effective, trained supervision is a most important requirements and mechanical departments are better situated than most to improve employee relations because sizeable groups of people work under relatively close supervision.

Mr. Whitman recommended more general use of employee and supervisor training courses, more frequent staff meetings of supervisors as well as higher officers and a special effort to recognize individual ability and encourage teamwork. He said that competent supervisors will not only study personnel problems, but present their need for new tools and equipment so factually that management can intelligently evaluate the needs and take appropriate action.

In closing, Mr. Whitman urged the Mechanical Division to give some attention to employee training and relationships and appoint committees as required to develop constructive information and suggestions regarding this important subject.

Address by E. H. Davidson

The trend toward diesel power seems definitely established and sufficient experience has been had to indicate the location and causes of accidents which result in casualties. While the pattern is not inflexibly established the mechanical officer will recognize locations and factors involving greater hazards. The modern diesel-electric unit requires a very high standard of housekeeping if accidents are to be avoided and a high efficiency of operation is to be maintained. A properly groomed unit is far easier to inspect and maintain and is less likely to be responsible for injuries to personnel. When difficulty, particularly with electrical gear or circuits, is experienced on a fouled unit, location of the cause of the trouble is often delayed because of condition of the equipment, repairs require greater time to complete and terminal time is increased.

A number of injuries resulting from falls caused by oil or grease accumulations on decks and passageways have been reported. Frequently the fouled walkway results from oil leaks at the diesel engines or pipe connections, resulting from inadequate maintenance. When these conditions exist there is little that crew members can do to correct them while en route. Another type of accident that has been too frequent is hand injuries caused by slamming doors. Several of these accidents have resulted in severed fingers and were caused by unbalanced air pressures between cabs and engine compartments. Absence of door checks or stops was a contributing cause in the accidents. While the majority of accidents from the above causes were relatively minor from consideration of time lost by the employees, injuries of a maiming nature occurred and future ability of the injured man was correspondingly impaired.

Failure of wheels under diesel-electric locomotive units is a matter of very grave concern. An increasing number of reports of failed wheels are being received and it is apparent that intensity of diesel wheel inspections should be increased. Our district inspectors have been instructed to be particularly vigilant in policing diesel wheel inspections and to emphasize the necessity of cleanliness. A crack in the plate of a dirt incrusted wheel could continue and extend without detection until failure occurred. I urge that emphasis be placed upon provision of proper

facilities for wheel cleaning and inspection; that pit inspection and whitening of wheels be used; that blasting of new wheels and wheels removed for turning be considered and that brake equipment be properly maintained and used to prevent overheating of wheels.

Another matter for serious consideration is inspections and the remedy of defective conditions. In our investigation of reportable accidents the instances where identical defects had been previously reported, either by engine crews or shop inspectors, a number of times preceding the accident, occurs too frequently. Where defects have been repeatedly reported and signed for as repaired, and subsequently an accident with attendant casualties occurs, it may logically be inferred that the defective condition had not been properly corrected. The terminals where these inspection reports are maintained are the places to initiate a follow-up program. Central and division mechanical offices do not generally have such reports available for continuous review and are therefore forced to delegate review of reports to motive power inspectors or other traveling representatives. Recurring defects shown on inspection and work reports may well be viewed as evidence of inadequate or insufficient repairs and as such call for corrective supervisory action. It is not to be expected that the upper supervisory mechanical officers will have either time or opportunity to follow the matter in detail. However, when these officers establish a policy that defects reported shall be promptly and adequately repaired and, through their assistants, impress on all concerned the fact that proper, effective and adequate repairs will pay off in accident reduction, lower maintenance expense and service reliability, a definite advance in safety may be anticipated.

Mechanical Problems

By W. J. Patterson

What is there ahead of us? New problems are constantly arising and old ones re-appearing the solution of which is not always easy. Some of the matters which require immediate attention appear to be hot boxes, diesel wheel failures, air brake inspection and maintenance, dynamic braking, and the presence of toxic gases and fumes in locomotive cabs and control compartments.

The introduction of diesel electric motive power and the rapid conversion to the use of such power calls for intensive research and development toward improved design, inspection and maintenance. The potential danger from failure of draft or running gear of locomotives or cars in longer and heavier trains operating at higher speeds, as well as making longer non-stop runs, is present and stresses the necessity for improved design and maintenance of cars and locomotives.

Engine crews in control compartments of leading units of multiple unit locomotives cannot readily detect early indications of overheated bearings, wheel failures, or other running gear defects. The record of one of the major railroads covering hot bearings detected by hot box alarms during a recent 12-month period showed that 64 were detected, 9 of which were on diesel-electric locomotives. Of these nine, five were detected by employees other than those in the control compartments of the locomotives. In one, members of the train crew detected the odor after an alarm and the train was stopped and inspected twice in a distance of about 40 miles, but the hot bearing was not found. Then after moving another 90 miles it was found that a journal on the locomotive had been burned off. This is a clear indication of the need for a more reliable form of hot box alarm.

At present many driving wheels under diesel-electric locomotives must be replaced because of failure or indication of failure long before the expiration of their normal life. We also know that many runs are being greatly increased in length, as well as in speed, with little or no inspection at so-called intermediate inspection points.

The failure of driving wheels under diesel-electric locomotives is a serious matter. I understand that as a result of a study of a special joint committee some changes have been made in the design of wheels. However, reports of defects found in new, unmounted wheels, and continued reports of failure, indicate the need for further research and development. Each railroad should give consideration to their practices relative to the inspection and testing of these wheels.

The development and use of current specifications for air brakes for freight cars has produced a brake which provides a much needed and long overdue means for improved freight train handling to meet modern operating conditions. Although the AB brake conforms to specifications which were made standard practice in 1933, some railroads have not yet fully equipped even all of their present interchange freight cars. The current air brake maintenance of freight cars is far from good, and getting worse, as indicated by inspections in train yards and on repair tracks.

You have heard a lot of reports in the past several years of serious difficulties with air brake equipment occurring during severe winter weather. Much was said about inferior material, but the fact of the matter is that most of the trouble was due to improper testing, or no testing, which resulted in a lack of proper maintenance.

There has been a marked increase in the use of dynamic braking during the past few years. You are reminded that dynamic braking must be considered as supplemental to and not as a substitute for the use of air brakes on individual cars, which is required by law. Dynamic braking already has led to a tendency to neglect air brake testing and maintenance.

Toxic Gases in Cabs

We have had reports of enginemen suffering from the effects of toxic gases and fumes in control compartments. Continued exposure even to small amounts of carbon monoxide gas can seriously impair the faculties of men, and even prove fatal. Many attempts have been made to determine the maximum allowable concentration of carbon monoxide in air without danger of ill effects. One of the most hazardous effects of carbon monoxide, insofar as train operation is concerned, is one of the first symptoms, which may well prevent the taking of any corrective action or the stopping of the train. That symptom is drowsiness. The Bureau of Safety investigated four serious train collisions during the past two or three years which resulted in 27 deaths and 190 injuries, in each of which there apparently had been no action taken by the engine crew of one of the trains to shut off power, apply brakes, or acknowledge signals just before the accident occurred. Unfortunately, because of the damage to equipment and the fact that, with one exception, all the occupants of the control compartments were killed, it could not be definitely determined just what the conditions were in the compartments at the time the accidents occurred. In the investigation of another rear-end collision in automatic block signal territory which resulted in one death and four injuries, the engineman of the following train stated that he apparently lost consciousness before the accident, as he could not remember anything from the time he left the last station, approximately nine miles from the point of the accident. The flagman of the train that was struck said that even though he had placed torpedoes on the rails, continued to give stop signals with a lighted fusee, and finally threw the fusee at the windshield of the locomotive as it passed, there was no acknowledgement of any signals, power was not shut off, and the brakes were not applied. The fireman, the only other occupant of the control compartment, was killed. In each of these accidents the locomotive was a diesel-electric. Prompt and serious consideration should be given to this matter.

I understand that a committee has been appointed to consider the question of carbon monoxide in control compartments. I suggest that the condition of air in control compartments of all types of locomotives be considered and that each railroad consider the matter in the light of their own operating conditions, particularly with respect to the heating and ventilation of the control compartments, their warnings and instructions relative to the dangers, signs, and symptoms of toxic gas poisoning.

Many of the mechanical supervisors of today are specialized technicians, with little or no previous railway operating experience, whereas in the past much of the actual operating supervision, particularly insofar as the head-end crews are concerned, was by mechanical supervisors who had years of operating experience. We are now finding some practices which appear to indicate that mechanical supervisors, perhaps in their desire to obtain maximum performance and insure protection against breakdowns, may be overlooking the necessity for full compliance with operating rules.

Findings as a result of the investigation of two recent derailments of freight trains which were caused by excessive speed because of trains being out of control on heavy grades are examples of this tendency to cut corners. In the one case a so-called air brake test was made after making up a short train, but a closed angle cock at the rear of the locomotive was not detected. In the other, the initial terminal air brake test was omitted and various operating rules of the carrier covering the operation of trains on grades were not observed. Had the operating rules been complied with, the accidents would not have occurred.

We are finding enginemen, as well as trainmen, who are of the opinion that the air brake system of a train is fully charged as soon as the brake pipe gage on the locomotive or caboose registers the standard pressure. With modern feed valves and large capacity main reservoirs, brake pipe pressure, particularly on short trains, can be built up in a short time, although reservoirs of AB equipped cars require considerably more time. This incorrect understanding had led to improper handling and results in an unsafe condition.

It is difficult for me to convince some of the member lines that when this division adopts a rule it applies to all the railroads alike and should be observed accordingly. Let me give you a typical example of what I mean. The last full year of air brake inspections by our men of trains departing from yards shows that 4,762 cars with air brake defects were either repaired in or removed from trains after such trains had been prepared and inspected by the railroads for departure. These figures are about 50 per cent above similar figures for the fifth previous year. The situation is not much different with respect to other classes of defects. Such a situation indicates that too many defective cars are leaving points where repairs should have been made.

Shipper's Views on Freight-Car Design

By L. L. Adams

The production and delivery of steel requires transportation in large quantities and continually. It is estimated that the production and delivery of one ton of finished steel requires the movement of 7 tons of material made up of 3½ tons of raw materials and 2½ tons of intermediate movements, plus one ton for the delivery of the steel itself. It is clear, therefore, why we in the steel industry are interested in loading rules and in railway freight cars. We have another important reason for our interest. Steel is the largest single commodity used in manufacturing railway cars.

Loading Costs High

I should like to make a few general observations about loading rules. You will notice that I did not include reduction in cost of loading among the advantages that we steel shippers have gained from our joint effort to improve the loading rules picture. While the comparative costs may have lessened if we consider dollar purchasing power between an earlier period and today, actual costs of loading our commodities have increased alarmingly. Furthermore, highway transport availability and utility have improved rapidly. In many instances our commodities can be loaded on rail cars. Most open-top trucks are equipped with devices for fixing loads of steel on the truck. Little dunnage is required and almost no labor on the part of the shipper. Highway vehicles are not subjected to the strains and impacts of rail movement. Riding on rubber, with improved spring suspension and with the load made an integral part of the vehicle by the tie-down devices, the shipment does not need the expensive blocking required for rail movement.

In many cases materials that require wrapping, shrouding, or other costly protection when moved by open-top rail car can be fully protected by a tarpaulin provided by the highway carrier. This means that frequently the final price of the steel to the customer is less if it is shipped by truck than if shipped by rail.

We are in a highly competitive business. There is intense competition between producers of steel and between them and the producers of commodities competitive with steel. Direct costs, such as those of wrapping and shrouding, or indirect costs, including labor and materials expended in affixing shipments to rail cars, cannot fail to affect the decision of steel producers and steel purchasers in determining whether a particular shipment shall move by rail or by truck.

Freight cars are the basic implement of railroad operation. Eighty-five per cent of railroad revenues are produced from goods carried in them. They carry the bulk of the country's commerce. They move ingredients for steel making and deliver most of the finished products. For a considerable portion of the last ten years there have not been enough of them, particularly of certain types. A number have grown old in the service and need to be replaced with larger and better models capable of being operated with less shop time.

On April 15 of this year the Defense Transport Administration stated that the condition of partial mobilization, which has been our situation for several years and may well continue to be for some time to come, required the building of 436,000 freight cars by July 1, 1954. D.T.A. was silent on the types of cars that should be built. The railroads are in a position to find out what kind of cars are needed for their business. In fact, one of the railroads' biggest customers, the steel industry, through the Traffic Committee of the American Iron and Steel Institute has advised railroads periodically of its views on the types of which new cars should consist.

Car Types Needed

United States Steel has been urging that more gondolas be constructed, especially in the industrially expanding west and south. We suggest that at least 10 per cent of the gondolas built be 65 ft. 6 in. in length. The loading of long material on short cars, with idlers or with bearing on two cars, is wasteful of car supply and very expensive to the shipper. Half of the gondolas built should have floors to which dunnage can be nailed. In the past this has meant wooden floors. Today, that is not necessarily true. The nailable steel floor developed by an American steel company has passed the experimental stage. Another steel company, and some railroads, are experimenting, with apparent success, with composite steel and wood floors. The objective is to combine the strength and durability of steel with the opportunity for reduced loading costs when bracing can be nailed to the floor. Building into cars better provision for bracing, or fixing loads with bands, will decrease the damage that results when holes must be cut or burned through car floors and sides in order to properly fix loads on cars.

We urge the construction of more 70-ton hopper cars to make it possible for us to reduce the number of cars handled in our mills and mines. Cars of greater capacity offer an opportunity for reducing transportation costs through the reduction of dead weight per ton of commodity carried and in billing, clerical and administrative costs. Also, less yard capacity is needed when cars have greater carrying capacity.

A relatively new problem in the hopper-car field is the effect of using car shakers. Apparently the car shaker is here to stay, because it is the best answer yet devised for hastening the unloading of many commodities under adverse conditions. Accordingly, we think that railroads must expect their hopper cars to be subjected to shakers and should design them to withstand the effects of these devices.

We have called attention to the need for an industrial box car. By this we mean a car with doors at least 8 ft. wide, with a steel plate across the floor at the door opening and a thick, strongly supported floor. Such a car offers opportunity to reduce loading and unloading costs through the use of modern industrial trucks with high carrying capacity. It also enables one to carry commodities of concentrated weight, such as tin plate, steel sheets and nails, without having them go through the floor en route.

Story of the 65-ft. Gondola

There are advantages to be gained by modification of car types, or by new types, but it is usually a difficult task to convince railroads that new or unusual types should be built. Two cars of fairly recent origin that have proved their value are the 65-ft. 6-in. gondola and the covered hopper. The only problem with either one today is that they are rarely in sufficient supply. Both cars were developed by industry with little or no support from the railroads. Perhaps I can best illustrate my point by briefly reciting the history of the 65-ft. gondola.

About 1925 the Carnegie Steel Company built new structural mills at the Homestead Steel Works. The old mills were kept in operation while the new mills were being built very close by. Much congestion ensued and some operations, including sawing beams into lengths, were moved to a point several miles away. To move these unsawed beams in double loads would have cost many thousands of dollars in labor and material. To avoid this the 65-ft. gondola was devised and twelve of them were authorized and purchased as a part of the construction project. These cars were so successful for short distances that the Traffic Department got the idea of using them on longer hauls and endeavored to interest the railroads in providing such equipment. Every railroad approached replied with a very polite but firm no.

After about a year of effort with no results a new campaign of actual demonstrations of the value of the cars in long hauls was started, using the 12 cars purchased by the Homestead Steel Works. Beginning with relatively short hauls and gradually extending the experiment culminated in a successful transcontinental shipment. During all this period the railroads displayed only a polite interest in the experiment and were not receptive to the idea of acquiring such cars.

In a final effort, one of these cars was loaded and shipped to Atlantic City for exhibition at a railroad meeting similar to this one. One railroad executive was so impressed by the car that he got approval of his board of directors for the purchase of 300 units. Thereafter, other railroads saw the advantages to be gained and, today, there are approximately 8,000 of these cars in service. They have provided not only a more efficient and economical facility for the shippers, but they have paid their way on the railroads in greater safety, fewer empty car-miles and higher load factor per car in the movement of long commodities. However, even today the supply of these cars is not sufficient to meet shippers' requirements after over 25 years of demonstrated usefulness.

Covered Gondola

Other problems are waiting to be solved. Much steel requiring protection from the weather is loaded on open-top cars or trucks because both shippers and receivers find it advantageous and less costly to load and unload with overhead cranes. This material must be wrapped and shrouded with paper when loaded on open-top rail cars. However, it can usually be shipped by truck with no other protection than paper wrapping and the tarpaulin furnished by the trucker. An interesting answer could be a covered gondola. Different types of sliding, telescoping and removable hatch covers are in use on river barges and lake vessels. Several different kinds of removable covers have been used on railroad cars from time to time. Perhaps from these devices ideas can be developed that will make possible suitable covered gondolas. An answer to this problem would help the railroads competitively.

What about wide loads? If gondolas of moderate length could have greater inside width, they would simplify the loading of many shipments that today present problems. Thousands of flat-car loads which we have made at great expense and with much difficulty would have been simple and relatively inexpensive had 120-in. wide gondolas been available. Such a car would not be a specialty car as it could be used in any service to which a gondola is usually put.

High Capacity Hoppers

The steel industry believes in, and practices, heavy loading of freight cars. We think that one of the best competitive opportunities that the railroads have is in the heavy, volume-freight field. We have been very happy to see the trend towards 70-ton cars instead of 50-ton capacity. It may now be the time to take the next step, at least with respect to hopper cars. Ninety-ton four-wheel trucks seem to be the practical answer to the objection that six-wheel trucks are too complicated and troublesome for freight service. One railroad that has a heavy trade both in iron ore and coal has quite a fleet of 90-ton hoppers and is building more. At least one other railroad has 90-ton hoppers now on order, and we confidently expect other orders will be placed. Cars of this capacity are subject to a limit of 251,000 lb. on the rails. To the plea that there are still some railroad structures that will not take this load, I suggest that a considerable number of such cars can easily be kept busy on heavy-duty railroad in volume business. I can see no reason for withholding the obvious advantages that exist in so many instances merely because the car could not be used universally. Furthermore, structures and ways are being improved constantly, so that the areas in which heavy cars cannot be used are being reduced regularly. In building cars to carry more freight per unit, saving of light weight in the car itself is important. High-strength, low-alloy steels have proved valuable in reducing light weight and in providing greater strength.

Freight Cars to Meet 1952's High-Speed Requirements

The use of diesel locomotives, with assists from electric and modern steam power, has resulted in greatly improved increased freight-train speeds and greater tonnage on trains. Where freight moved at 30 or 40 m.p.h. some years ago, 60 is a normal speed today. However, most of our freight cars were built for the slower speeds. Trucks, draft-gear and spring suspension were designed basically for much slower freight-train speeds and for lower switching impacts than those of today. Vertical oscillation, lateral sway and slack action under new train speeds and high-speed switching impacts give the freight and the cars a beating. We need the faster movement. Shouldn't we build resistance to its effects into our cars?

The GAEX car provides an interesting attempt to do this through the use of a different truck design and means of cushioning end-to-end shock. Improved trucks and other devices to protect against some of the effects of greater speed and greater shock have been available for some time, but have not been widely used. Many of the new cars coming out do not seem to be built for today's faster speeds, at least not as far as protection to lading is concerned. If available devices are not all that is needed, I am sure that you in this organization can find the answers. The cost of freight loss and damage demands action. I would point out to you that we shippers have a direct interest in this cost—we pay for it in the end. Many factors other than riding qualities and increased cushioning of slack action built into railway cars will reduce materially damage to freight.

One more thing I should like to mention here. We hope that every possible effort will be made to hold the bad-order percentage to an absolute minimum. Two years ago the high percentage that had been allowed to develop was a deterrent to the effort all of us were making to reach peak industrial production. It also resulted in additional business going to the competitors of the railroads because the rails did not have enough cars in good condition to handle all the freight that was available to them.

Along this line I have been much interested in the decision of some of the coal railroads to build greater strength and longer life into hopper cars by using high-strength steels in the thicknesses normally used when such cars are built of carbon steel. In fact, in some cases greater than normal thicknesses are being used. It is believed that these cars will go double the normal time before classified repairs are necessary.

Whether the objective is to make possible the greatest practicable payload capacity in the cars, to make your allotted tonnage of steel produce more cars, or to build more strength and longer shop-free time into them, these high-strength, low-alloy steels present many challenging opportunities. United States Steel's Railroad Research Bureau stands ready to assist you in working out designs that will utilize them to the best advantage.

In any case, it appears to many of us that it is possible to build freight cars that are better suited to the requirements and conditions of the 1950's instead of cars fundamentally the same as those built 30 years ago. It is good to see that railroads are tackling some of these problems. We are certain that improvement will be the result.

Car Construction

Continuing a practice started in 1936 the Car Construction Committee presented statements of the freight cars ordered during the year ended April 30, 1952, to show the extent to which member roads are following A.A.R. standards. Of 19,872 box cars reported, only two were not A.A.R. standard, and 1,000 are standard except for dimensions and the inclusion of floating center sills. The remainder are about evenly divided between cars which are A.A.R. throughout and cars which vary from standard in dimensions only.

Of 13,430 50- and 70-ton hopper cars, 4,500 are not A.A.R. standard, 5,750 are standard except for dimensions, and 3,180 are A.A.R. standard throughout. Of both types of cars only 13.5 per cent are not A.A.R. standard in any respect. Of a total of 18,282 cars of types for which there are no standard designs, all except 1,722 had center-plate heights of 25¾ in.

Center of Gravity Height

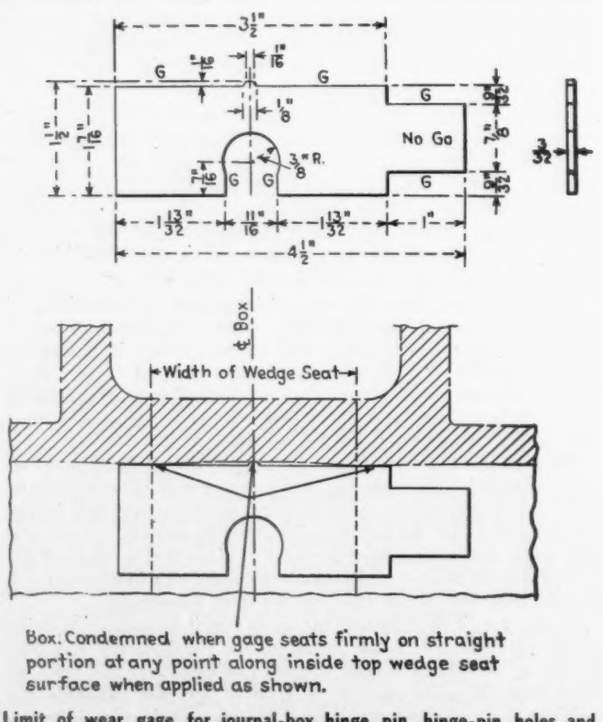
The committee recommends that a height above rail of 84 in. for the center of gravity of a car, loaded or empty, be the maximum that should be offered for inter-change service without the possibility of incurring charges for special handling. This is the result of a study of recommendations of the Engineering Division and investigation of the maximum speeds on curves of various railroads. The committee also recommends that the subject be referred to the Operating-Transportation Division for inclusion in the Car Service Rules.

Passenger Car Outlines for Unrestricted Operation

An outline diagram, similar to that for freight cars, now shown as Plate B in the Manual, has been developed for Passenger cars and is submitted for letter ballot action. If adopted, it will become Plate P in the Manual.

Condition of Auto Loading Devices

Auto-loading devices in cars offered to the automobile industry have frequently been in unsafe condition. Lubrication of this equipment has been neglected and a lubrication chart has been prepared and is recommended for letter ballot action. It is also proposed to place the placard showing the date of last lubrication on the side wall of the car near the door instead of on the end where it can not be seen without getting into the car and frequently requires a light.


G
No Go
3/8" R.
Box
Width of Wedge Seat
Box. Condemned when gage seats firmly on straight portion at any point along inside top wedge seat surface when applied as shown.

Limit of wear gage for journal-box hinge pin, hinge-pin holes and wedge seat in box ceiling.

Refrigerator-Car Tests

Test runs of cars loaded with Italian prunes with ice and two per cent salt, between Oregon and Chicago and the east, using three types of fans, and of oranges between California and the eastern seaboard, using four types of fans, have established that the use of built-in fans are as effective for precooling as the stationary or portable type used by shippers, and that they precool for less cost. A series of trips between Chicago and New York were made to determine whether the present rule of filling the bunker by reicing at destination is necessary to maintain proper temperature. The data developed that, in general, if the ice in the bunker was maintained at a level one-half or more of bunker capacity, proper temperatures were maintained.

Mounted-Wheel Car

In collaboration with the Committee on Wheels, the Car Construction Committee studied the matter of developing a suitable design of car for transporting mounted wheels. Drawings covering the proposed design were included in the report and should be helpful in eliminating damage which occurs in transporting wheels mounted in ordinary flat or gondola cars secured by various kinds of special locking which has to be applied when wheels are loaded and removed when they are unloaded.

Control of Side-Frame Failures

During the past year 18 additional designs of truck side frames and 23 additional designs of truck bolsters have been approved. The sub-committee is now giving consideration on how to eliminate inadequate designs from service. The rules of interchange now outlaw T- and L- section frames, effective January 1, 1953. But some U-section frames are little, if any, better and these poorer frames cannot be weeded out solely on the basis of age. It is considered economically unjustifiable at present to bar all designs without A.A.R. approval for interchange service. The committee is of the opinion that the only rule which could outlaw the bad frames and permit the good ones to remain in service must be based on manufacturers' pattern numbers. Before this can be done a comprehensive list of service failures must be available. Success along this line can only be obtained if enough large member roads issue instructions that a record of all side-frame failures be reported to the A.A.R., giving the manufacturer's name and pattern number.

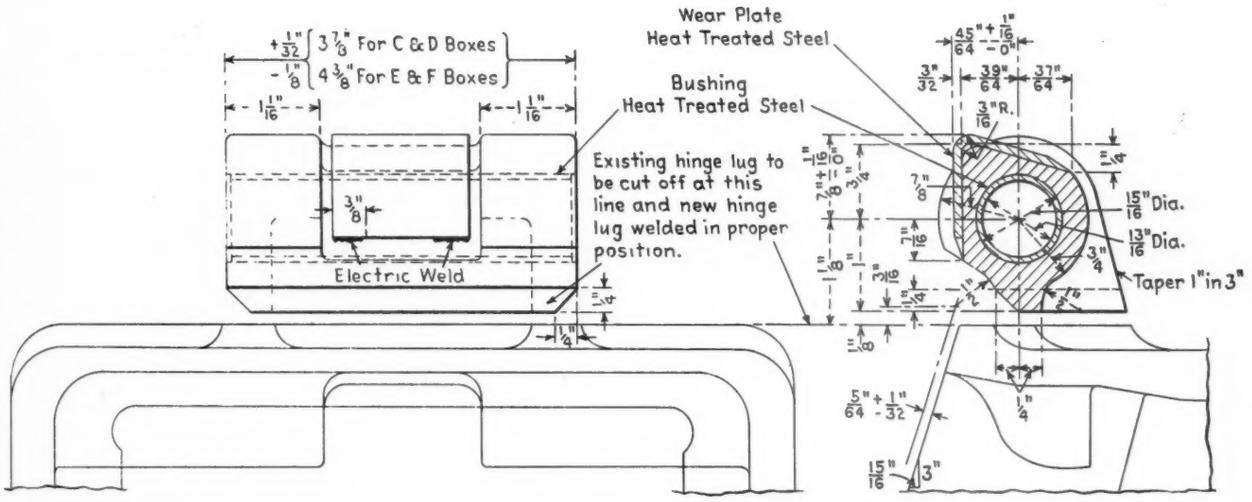
The discussion drew attention to the fact that not all frames failed because of weakness of the design. Corrosion is also a cause. Some form of chemical rust inhibitor, if one can be developed, was suggested as a means of prolonging the life of these castings. Cement is not satisfactory because it conceals defects from inspection.

Life Expectancy of Snubbing Devices

The delivery of hydraulic testing machine now on order for use in determining the life expectancy of snubber groups, package units and built-in snubbers is tentatively set for October 1, 1952. This machine simulates road conditions more closely than the drop-test machine at Purdue University which it was first planned to use. Practically all the equipment which it was planned to use in the drop tests can be used with the new equipment. This project was highly recommended in the discussion. One member called attention to the report of a special committee on damage to dressed beef to the National Freight Loss and Damage Committee of the Freight Loss and Damage Section, Operating and Transportation Division, A.A.R., in which a large amount of damage to meat hindquarters in refrigerator cars is attributed to truck conditions.

Wear Limits of Journal-Box Hinge Lugs, Hinge-Pin Holes and Wedge Seats

An extensive investigation of worn hinge-pin lugs and hinge-lug pin holes on journal boxes has developed that the principal reason for wear is the poor alignment of the lug with respect to the face of the box. In conjunction with the truck manufacturers' committee and independent manufacturers a number of gages were developed, submitted to letter ballot and added to the Manual. These gages at the time of manufacture insure the proper alignment of lugs and provide a tight fit between lids and box faces. This reduces the wear on the pins, lugs and lids.


Wear Plate
Heat Treated Steel
Bushing
Heat Treated Steel
For C & D Boxes
For E & F Boxes
Existing hinge lug to be cut off at this line and new hinge lug welded in proper position.
Electric Weld
15"Dia.
13"Dia.
Taper 1"in 3"

The application of replacement hinge lug.

The use of a roller instead of flat plate between hinge lug and spring assists materially in reducing wear on the lug.

Hardened-steel wear plates and bushings for application to lugs on new boxes were also added to the Manual as recommended practice. Their use does not improve the lid fit on new boxes, but they provide increased life for lugs in that both wear plates and bushings may be replaced if worn. These details are patented and it is recommended that their use be left to the choice of the individual railroad.

The committee deemed it inadvisable to recommend the application of bushings and wear plates to worn holes and lugs of existing side frames and saparable boxes.

For letter-ballot action the committee recommends a new Rule 24 in the Interchange Code prohibiting the application of second-hand or reconditioned separable journal boxes or truck side frames if the pin holes in the lug are enlarged to ⅞ in. diameter or more and if the hinge lug is worn to 3/32 in. less than the minimum distance for a new lug when measured from the edge of the pin hole to the apex of the lug radius, or if the contour of the ceiling of the box at the wedge fit is worn to a depth equal to or more than 1/16 in. The cages for determining these dimensions are included in this summary of the report.

Reclamation of Journal-Bearing Wedges

For letter ballot action the committee recommends a change in Interchange Rule 23 permitting journal-bearing wedges to be reclaimed by machine grinding or reforging, provided the original contour of the wedge is restored without reducing the nominal thickness of the crown more than 3/32 in.

Icing Damage to Metal Running Boards

The attention of the committee has been directed to the damaging of end sections of metal running boards when icing refrigerator cars where the ice cakes strike the running board before entering the far hatch opening. The committee's opinion is that it is inconsistent to require safety appliance details to be constructed so as to withstand unfair usage such as dropping heavy cakes of ice on them. It was suggested that skids be used for carrying the cakes across to the far hatch opening without contacting the running board.

Several new designs of metal running board, approved by the Car Construction Committee, have been referred to the Safety Appliance Committee for concurrence.

A meeting of a joint subcommittee of representatives of the Safety Appliances, Car Construction, and Arbitration Committees was held to determine under what conditions the running boards can be welded. Recommendations are now in the hands of the committee for approval.

Revised Brake-Beam Camber

The committee recommends that the requirements for brake-beam camber shown on Manual pages E-85 and E-86 be changed from ⅞ in. plus or minus ⅛ in. to plus ¼, minus ⅛. The increase in the tolerance for new beams will permit the manufacturers to increase the camber sufficiently to compensate for the loss of camber in service.

Section III, Paragraph (b), of Specifications for the Repairs to Certified Brake Beams for Freight Equipment now provides that tension members must be scraped when worn more than 1/32 in. Tension members of Unit type beams will stand more cross-sectional reduction in area than now permitted. The concensus of opinion of the committee is that an exception as between cast-steel and solid-truss beam of the Unit type and other types should be made until such time as experience may demonstrate that changes that are not obvious now are desirable.

A proposed exception for the Unit and Davis type beams from the hammer test near each end at the back of the compression member while under proof test is not agreed to by the committee because the hammer tests requires only a few seconds and may occasioanlly disclose a defective condition which would not otherwise have been discovered.

Bottom-Rod and Brake-Beam Safety Supports

Special attention was given to the matter of existing designs of bottom-rod and brake-beam safety supports. Down through the years, a substantial number of such devices have been approved by this committee, but it has been found that many of the older designs are not suitable for present day operation. The committee assembled data pertaining to all of these devices and those not meeting present day requirements will be eliminated in the interest of preventing train accidents by reason of failure of these devices.

In the discussion one member advocated developing more satisfactory supports or eliminating them altogether. Some of them have a multiplicity of parts and he believed were the cause of more accidents than dropped brake beams.

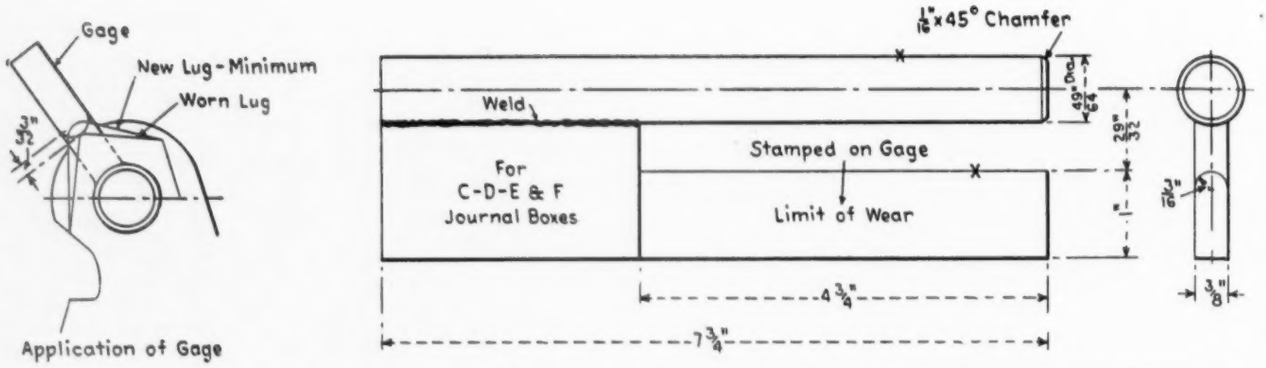
Welding Z-Section Center Sills

In order to eliminate the possibility of undesirable welding it was recommended for letter ballot action that the note on page C-6 of the Manual be modified by eliminating the permissibility of intermittent welding and providing only for a continuous electric weld penetration minimum 30 per cent full length.

It has been discovered that cracks have developed in the 1941 design lightweight body-bolster center filler, in the transverse rib.

Bolster Center Filler Revised

Impact tests of cars with the original and a modified design of the center filler clearly demonstrated that the stresses are way beyond proper limits in the original 1941 designs, but that under identical conditions the stresses in the modified design are well within well accepted design limits. For letter ballot action it is



Limit of wear of hinge is indicated when distance from edge of pin hole to apex of lug radius permits gage to pass over lugs of journal boxes C, D, E and F.

proposed that all plates in the Supplement to the Manual showing the 1941 center filler incorporate the modified design.

Retaining Valves on Open-Top Cars

The present specifications on Manual pages E-66 and E-67 is based on measurement from the top of the car and does not always provide adequate clearance above the retaining valve. The proposed change specifies a clearance of 6 in. between top of retainer and any obstruction above to permit application of exhaust gage fitting for testing retainer and brake-cylinder leakage.

Strap Anchors on Flat Cars

The report covers additional design of anchorage for securing lading straps and wire to gondola cars, also an anchorage arrangement for application to flat cars. The use of anchorage devices to permit safe securement of loads has met with great favor by the shippers as it enables them readily to secure their lading to cars with minimum time and expense. It also eliminates the necessity of cutting holes in car sides or elsewhere for securement of lading straps or wires, thereby avoiding equipment abuse.

One discusser thought the anchorage arrangement for flat cars should be made standard rather than recommended practice. He called attention to the failure of straps secured to anchorages attached to the sides of open-top cars, by cutting on the edge of the top chord member of the car side.

A and B Ends of Passenger Cars

In order to provide uniformity and convenience in designating sides, ends, journals, and journal-box locations on passenger cars, it is recommended for addition to Section L of the Manual that the B end be defined as the end on which the hand brake is located; if the car has two hand brakes, the B end is that toward which the piston of a body-mounted cylinder moves in a brake application, or the end on which the retaining valve is located; or the vestibule end. If none of these definitions is applicable, the owner shall designate the B end. Wheels, journal boxes and contained parts will be numbered starting at the B end, one on the right, two on the left, etc.; or, facing the B end, numbered R1, R2, etc., on the right, and L1, L2, etc., on the left. In case of conflict on self-propelled cars, locomotive designating system will supercede car designating system. In identifying equipment under the car, facing the B end, the parts will be named and the side of the car indicated as right or left. Where more than one part, such as battery boxes, are under the car, these will be indicated as first (the nearest) and second, and the side of the car designated as left or right.

Location of Routing-Card Boards

To increase the convenience of the location of routing-card boards, particularly for application in train yards, it is proposed for letter ballot action that the last paragraph of Manual page C-42-1949 be changed to read as follows: "On other than house cars card boards must be located on each side of the car near bottom at left-hand end facing side of car, or on outer end of end sill. On cars equipped with center sills only, card boards must be located near center of car, attached to outer end on running-board support, or to outer end of body bolster."

Designating Material Thicknesses

It has been decided that hereafter A.A.R. prints involving thicknesses of material will have the thickness shown in decimals rather than the gage of the material.

Car Designating Letters

The committee proposes for letter ballot action the addition of a number of definitions of freight and passenger cars. Box cars having A.A.R. classification XME, when insulated, will be designated Class XMEI. To differentiate between LO covered hopper cars and plain hopper cars equipped with roofs, the latter will be identified with the letter R affixed to the regular symbol. CSB cars now defined as combined sleeping and baggage cars will be redefined as baggage-dormitory cars in order to eliminate improper assignment.

On recommendation of the Committee on Tank Cars the General Committee, as of June 15, 1951, approved specifications Class AAR-205A300-W and authorized tank cars conforming thereto for use in the transportation of nitrogen fertilizer solution, inhibited, a commodity not coming within the scope of the I.C.C. Regulations for the Transportation of Explosives and Other Dangerous Articles. It is proposed for letter ballot action that this specification be added to the list of tank-car specifications now designated under the classification TM.

Insect Infestation of Box Cars

The presence of weevils, or other insect pests, in any quantity in a freight car frequently results in rejection of the entire consignment. Even if the commodity itself is not subject to infestation, the presence of these insects may infest the consignee's property. There is also the possibility of condemnation under the Pure Food Act of the entire consignment by federal or state authorities. The committee reports that more thorough cleaning of existing cars has been responsible for improving the condition of cars offered for the shipment of grain and food products, and sets forth an inspection procedure and methods for dealing with cars which are infested. Concerted action by railroads and shippers, it is believed, will still further reduce the infestations.

In the Construction of Sleeping Cars

The members of the committee are J. A. Gower (chairman), assistant mechanical engineer, PRR; F. G. Moody (vice-chairman), superintendent car department, NP; R. B. Winship, mechanical engineer, CPR; J. McMullen, consulting engineer, Erie; R. H. Graff, assistant engineer, car equipment, NYC; H. L. Price, Mechanical assistant (car), AT&SF; F. J. Herter, engineer car, canstruction, C&O; H. L. Holland, assistant mechanical engineer, B&O; N. A. Passur, engineer car construction, SP; F. Fahland, general mechanical engineer, UP; K. H. Carpenter, superintendent car department, DL&W; W. A. Pownall, assistant to general superintendent motive power, Wabash; W. F. Kascal, mechanical superintendent, T&P; J. R. Douglass, assistant superintendent shops, L&N.

(The report was accepted and recommendations referred to letter ballot.)

Locomotive Construction

Auxiliary Air Supply on Diesel Locomotives

Amended I. C. C. Rule 205 (a) is now fully effective and presumably all carriers involved are complying with the rule as written insofar as having a separate supply of air available, suitably protected by check valves, for the operation of pneumatically actuated controls, is concerned. There appears however to be some need for unification or clarification of the definition of what constitutes a complete cycle of reversal of control equipment in making the test required under the rule. E. H. Davidson, director, Bureau of Locomotive Inspection, Interstate Commerce Commission, in his letter of January 31, 1951 set forth a definition, included in the 1951 report as follows:

"For the purpose of the rule we consider one cycle may be defined as operation of controls actuated by air pressure incident to following described movements:

Throttle lever: Movement from full open to closed position and then to full open position.

Reverse lever: Movement from position for forward movement to neutral position and then to position for reverse movement.

Transition lever: Movement from full advanced position to 'off' position and then to full advanced position."

In the same letter Mr. Davidson commented further as follows:

"I would emphasize that the number of cycles specified in the rule represents minimum requirements for purpose of test only and is not necessarily intended as a measure of quantity of air required for manipulation of controls in order to stop a locomotive. Such quantity determination is a responsibility of the railroad company. The size of control air reservoirs probably will vary as affected by the character of service, gradients, size of locomotive units and other characteristics of individual railroads. I presume that you will bring the distinction between testing under the rule and operating instructions to the attention of your member railroads."

While the definition as outlined above appears simple and clear, it seems to be subject to some variation in interpretation. This is particularly true in the case of locomotives with automatic transition. On such locomotives, movement of the transition lever actuates only the first step in the transition. Subsequent steps are actuated automatically, requiring no further movement of the transition lever. In this particular case, one interpretation of the definition requires the Carriers to provide artificial means for actuating any steps of transition beyond the first, the number of steps depending on the number of transitions provided on the locomotive. If this interpretation is to be uniformly applied, it appears that the definition should so state. It should be pointed out however that in the utilization of the supply of air required under Rule 205 (a) for accomplishing the ultimate purpose of the rule, namely the plugging of the traction motors, actuating contactors beyond the first step in transition is not involved.

In the preliminary stages of the investigation by the joint committee which handled the docket for the Association of American Railroads, numerous tests were conducted which would indicate that the existing supply of air on a majority of the locomotives in service was sufficient to comply with the procedure outlined in the definition if leakage of air from the control system was properly controlled. This applied primarily to locomotives with manual transition in either road or switching service. However, some railroads, in attempting artificially to actuate the controls for successive steps of transition on locomotives with automatic transition, find that they have difficulty in performing the three cycles of reversal of control equipment as required by the rule with the existing supply of air.

The committee has also received reports that on some of the earlier General Motors road locomotives with pneumatically actuated throttle control, an interpretation has been placed on the rule that requires that these pneumatically actuated throttle controls receive their air supply from the protected reservoir. In view of the fact that these throttle controls are not involved in the procedure of plugging the traction motors, it was recommended by the builder that the air supply for the throttle controls be changed so that it would not be taken from the protected air supply. Some exception apparently has been taken to this recommendation.

The committee has had some correspondence with Mr. Davidson with the view toward having the definition clarified, particularly with respect to the locomotives with automatic transition and the pneumatically actuated throttle controls, as mentioned above. The matter is being handled further with the General Committee. At this time, however, it appears important to point out to the Members that, if the above interpretations are made final, some difficulty will be had in making the three tests required under the rule without increasing the protected air supply. The efforts of the committee were to the effect that the definition of what constitutes a complete reversal of control equipment should follow more closely the procedure required in plugging the traction motors and utilizing only such controls as are available to the enginemen in this emergency procedure. While, as Mr. Davidson points out, the number of cycles specified in the rule represents minimum requirements for purpose of test only and is not necessarily intended as a measure of quantity of air required for manipulation of controls in order to stop a locomotive, it does not appear to the committee that these items can logically be separated. The purpose of the protected supply of air is solely to give enginemen an emergency means of stopping a locomotive which is otherwise out of control.

It should also be pointed out that in the report of the joint committee it was suggested that the dynamic brake lever, if present, be included in the test of reversals of control equipment. This feature is not mentioned in Mr. Davidson's definition and therefore need not be included in any official tests under the rule. This in spite of the fact that the instructions to the enginemen should remain as originally recommended, namely that the enginemen attempt to apply the dynamic brake in the usual manner.

Rule 205 (a) and Budd RDC Cars

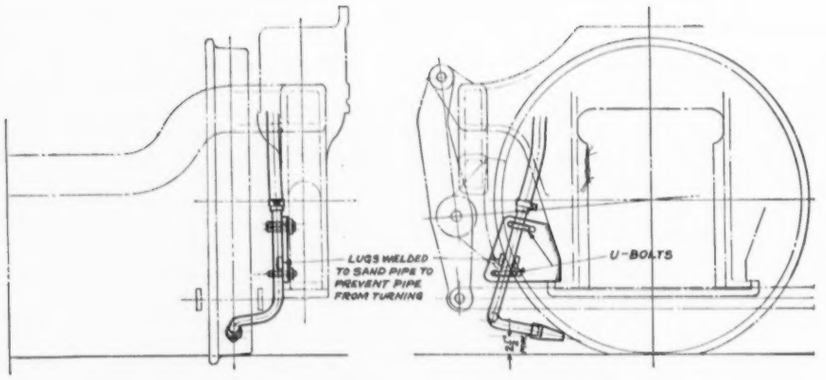
The Bureau of Locomotive Inspection has called to the attention of owners of Budd RDC cars, the necessity of having such cars comply with Rule 205 (a) in that there were pneumatically actuated power controls on such cars. The matter has been handled with the owners and for the benefit of Members who are contemplating the acquisition of Budd RDC cars, the following brief summary is included:

As originally built, the Budd RDC cars utilized a power cut-off switch. In the event of emergency application of the air brakes, this switch, by means of electro-pneumatic devices, reduced the engine speed to idle and disconnected the engine from the torque converter. Inasmuch as the braking effect of the engine and torque converter was not considered a reliable means for stopping a car otherwise out of control, it was agreed that the power-cut-off switch on existing units would be permanently nullified, thus removing this control from the scope of Rule 205 (a). The only other pneumatically actuated control on these cars is an engine water diverting valve, which, under control of the engine cooling water temperature, circulates the cooling water through the engine and to the storage tank, and when more cooling is needed, diverts the water through the cooling radiators mounted on the roof. A small air reservoir protected by a check is required for compliance with Rule 205 (a). Future cars will, of course, be equipped by the builder so as to be in compliance with the rule in the above mentioned respects.

Bracketing of Sand Pipes

The practice of supporting the sand pipes on the brake rigging that is followed by the builders of diesel-electric locomotives has several objectionable features. The delivery of sand in relation to the line of contact of wheel and rail varies greatly when brakes are in release, that is, the position when sanding for maintaining tractive force and when brakes are applied, and particularly so when brake shoes are worn thin. The delivery must necessarily be positioned to provide effective sanding for the latter condition, with the result that it is not the most favorable for traction. Another objection is the influence that wear in the brake rigging has on the lateral positioning of the sand delivery on the rail. There is also the problem of getting the maintainers to make the required allowance for shoe wear to avoid cutting out the sand pipes and delivery nozzles from contact with the wheels.

The accompanying drawing shows an effective application recommended by the committee. It is to be observed from the



Method of applying sand-pipe brackets to diesel locomotive truck frames.

drawing that with the application of the lugs to the pipe to provide a flat face to the brackets and the U-bolt clamping arrangement the sand pipe can be positively secured in its applied position to maintain an unvarying sand delivery relative to line of wheel to rail contact. The rather severe pipe bends that are necessary in this application are reported as not promoting a rapid cutting out of the pipes.

The diesel section of the report also made recommendations with respect to mounting control devices on journal boxes; the standardization of a number of diesel-electric locomotive items and a detailed progress report on road service tests of wheel slide detecting devices on three roads; the New York Central, Pennsylvania and Chicago & North Western. The devices reported on were developed by American Brake Shoe Co., General Electric, Spring Packing Corp. and Adams & Westlake.

The committee expressed opinion in favor of continuing the present air brake equipment on diesel-electric locomotives rather than to apply a modified ET6 type to road switcher in order to make it possible to operate these switchers in trains with road power now equipped with 24RL.

The committee is also studying the question of the strength of diesel-electric locomotive underframes. Replies to a questionnaire sent to 33 roads indicate that while the original complaints mentioned mostly damage to sills or damage to underframes between bolsters, replies from some of the roads indicate no trouble at such points but do indicate failures of the bolster and center plate arrangement.

This matter has been discussed with representatives of the locomotive builders and they fully understand this problem.

The steam locomotive section of the report (1) brought up to date the status of 34 welded boilers and 78 welded boiler shells now in service and 33 more on order; (2) recommended, as a letter ballot item, a number of revisions in the rules for storing steam locomotives; (3) changes in manual pages covering the welding neck flanges and (4) made recommendations with respect to multiple bearing crossheads and guides.

The gas turbine section of the report brings up to date the status of the several developments. The Union Pacific's four American Locomotive Company-General Electric units are described in Mr. Fohland's discussion which follows this report and the four other United States developments were described as follows:

Westinghouse Oil-fired Gas Turbine Locomotive

The Westinghouse-Baldwin 4,000 horsepower gas turbine locomotive was completed May 1, 1950. Last year's report covered the operation of this locomotive from its completion to March, 1951.

On March 26, 1951, the locomotive was placed in experimental freight and passenger service on the Pittsburgh & Lake Erie, operating on residual oil. This operation was generally satisfactory, but service experience indicated that certain improvements could be effected in the controls and in the method of burning and handling residual fuels.

Westinghouse developed a disc type rotor for the turbines, which was an improvement over the single piece forged rotors originally used in these turbines.

After several months of operation, it was decided to remove the locomotive from service to effect modifications which operating experience on the Pittsburgh & Lake Erie had shown to be desirable, and to replace the original turbine rotors with the new disc rotors.

This locomotive incorporates a novel wheel arrangement, being carried on four four-wheel trucks without the use of span bolsters. This type of running gear had not been used previously. In service, at speeds up to 85 m.p.h., the riding qualities of the locomotive are excellent, and no troubles have been experienced with the trucks.

During the latter part of the year, the locomotive was in the Baldwin-Lima-Hamilton plant having modifications made, after which the units were subjected to repeated load tests, starting tests, and operation to check the performance of the new controls, many of which have been made automatic.

The locomotive was delivered to the Pennsylvania and made its first run on February 19, 1952. It is assigned to baggage and express train service, handling a normal consist of 29 cars, 2,000 tons, between Harrisburg, Pa. and Altoona. Practically all of this operation has been with residual No. 6 fuel oil. Operation on the residual fuel has in general been satisfactory. The locomotive develops approximately 5 per cent additional horsepower above the rating with this fuel.

The total accumulated mileage since the locomotive was built to March 15, 1952 is approximately 13,000.

Coal-Burning Gas Turbine

Following the successful operation of a full-scale Houdry gas turbine unit for 1,000 hours, using pulverized coal, research activities on the Allis-Chalmers 4,200 horsepower gas turbine locomotive unit were accelerated.

A stationary test plant, using full-size components required for the locomotive, has been set up at the Alco Products Division of the American Locomotive Company, Dunkirk, N. Y. As with any major research activity, it has been necessary to make changes as test procedures dictate, and the plant is now set up to burn coal in developing up to full horsepower loads.

Tests are now being made on coal, and it has been decided that after 750 hours of operation is reached it will be shut down and the principal components, particularly the gas turbine, closely examined, and the over all plant appraised which will dictate future planning.

A more detailed report will be available in the next several months as to the results obtained after 750 hours under comparatively full temperature and load conditions, burning coal.

The project of building a second pulverized coal-fired gas turbine, using the Elliott turbine and compressor, has been abandoned.

Santa Fe Oil-Fired Gas Turbine Locomotive

The Santa Fe 3,750 horsepower gas turbine passenger locomotive project, utilizing an Elliott oil-burning gas turbine and being built by the Baldwin-Lima-Hamilton Corporation, has been abandoned. The reason for this action was the delay by the manu-

facturers in producing a satisfactory gas turbine and compressor combination.

Baldwin-Lima-Hamilton Corporation Free-Piston Gas Turbine Locomotive

The Baldwin-Lima-Hamilton Corporation's free-piston 3,200 horsepower gas turbine locomotive is still under consideration. This project is an experimental one, and is closely allied with development work on gas generators that the Corporation is carrying on for the Navy. All work on the Navy project is classified as restricted.

When security measures now prohibiting a report of progress of this development are lifted, a complete report will be rendered.

Foreign Gas Turbine Locomotives

The first gas turbine locomotive, No. 18000, to be used in British railway service, is a 2,500 horsepower Brown-Bovari oil-burning unit which is assigned in experimental passenger service.

After correction of a fatigue failure which occurred in the first row of turbine blading, the performance of this locomotive has been satisfactory. It is essentially similar to the original Brown-Bovari locomotive, using a single shaft turbine with a regenerator. Its overall thermal efficiency is reported to be 16.9 per cent. The locomotive has performed well, but was largely out of service during the past winter because its train heating boiler was inadequate.

A second gas turbine electric locomotive, designed and constructed by the Metropolitan Vickers Electric Company, Ltd. for use on the Western Region of the British Railways, has been delivered and is being prepared for main line service.

This locomotive, No. 18100, will be the first all-British unit. The power plant is a 3,500 hp. open cycle unit, similar to the GE turbine in its arrangement. Locomotive No. 18100 is of single cab construction, arranged for double-end operation, and is 66 ft. 8 in. overall in length. The total weight is 129 tons 100 lb. The maximum tractive effort is 60,000 lb. and continuous tractive force is 30,000 lb. The maximum gas temperature is 700 deg. C. (1,292 deg. F.). It has two six-wheel trucks, and is geared for 90 m.p.h.

It is reported that the North British Locomotive Company is building a pulverized coal-burning gas turbine locomotive for the British Railways, using a Parsons power plant. This unit is being developed in conjunction with the Industrial Research Council.

The report was prepared by a committee of which A. C. Hoppe, engineer research and development, Milwaukee Road, was chairman. Three vice-chairman, of the steam, diesel and gas turbine locomotive sections, respectively, were C. H. Knowlton, assistant engineer equipment, NYC, G. F. Wiles, superintendent motive power, B&O (eastern region) and H. C. Wyatt, assistant general superintendent motive power, N&W.

Discussion

F. Fahland, general mechanical engineer, Union Pacific, gave the following up-to-the-minute report on that road's gas turbine locomotives.

"The first gas turbine locomotive, No. 51, was placed in service January 31 of this year; the second on April 9, the third on May 7, and the fourth on June 4. The Union Pacific now has four gas turbine electric locomotives in freight service on the 176-mile district between Ogden, Utah and Green River, Wyoming. The track in this territory has a maximum grade eastbound, Ogden to Wasatch, of 1.14 per cent, and a maximum westbound, Green River to Evanston, of .82 per cent. The locomotives are handling up to 5,000 tons over the .82 per cent grade westbound.

"For the three-month period, January 31 to April 30, which locomotive No. 51 has been in service, it has traveled a total of 26,825 miles, producing 104,436 thousand gross ton miles. During this time, 419,123 gallons of turbine fuel and 28,170 gallons of diesel fuel have been used. The turbine has operated a total of 1,233 hours, using 4.28 gallons of fuel per thousand gross ton miles. The availability of locomotive 51 during this period was roughly 76 per cent. It is expected that the availability for the other locomotives will be higher because they have not been subject to the combustion chamber troubles which were experienced with 51.

"The gas turbine locomotive has a performance characteristic which recalls the best of the steam locomotive; namely, it has the surplus of power which is available for acceleration. Road foremen who have followed these locomotives report that the single unit 4,500-hp gas turbine electric locomotive will start approximately the same train as a three-unit 4,500-hp diesel locomotive. The gas turbine will accelerate from a starting speed to a maximum speed much faster than the diesel units. This will provide for better time over the road and is a step away from the drag performance associated with diesel operation.

"Performance of the gas turbine locomotives may be considered satisfactory; however, we do not mean to imply that there have been no mechanical defects. The gas turbine like any and all mechanical equipment received by the railroads, is subject to some failures. Being a new type of motive power with considerable new equipment and parts, it is only reasonable to expect that so-called "bugs" will show up. One defect in the power plant which appeared and is being corrected is that the first stage nozzle retaining bolts broke and the loose heads caused excessive thrust on the turbine rotor, resulting in the failure of the thrust bearings. This failure occurred on the first turbine after approximately 1,100 hours. The manufacturer has made necessary design changes and a program to progressively modify the turbines now in service is underway.

"Like the diesel locomotives, the gas turbine electric locomotive is heir to all the shortcomings that are inherent with electric drives. The problem of applying tractive force equally among eight drive axles becomes more difficult with the surplus power from the four main generators and the horsepower weight ratio available on these locomotives. The designers of electric driven locomotives, in general, have not paid sufficient attention to static weight distribution and the dynamic effects of center plate load shifting. In an effort to correct the weight distribution on the gas turbine locomotives, some ballast has been added to the span bolster just ahead of the front truck.

"Another feature on the gas turbine common to the electric drives is that stresses in pinion gears are approaching the limit. The only answer to this problem would appear to be better material and more care in the manufacture to eliminate defects which may act as stress risers.

"Operation of the gas turbine electric locomotive has brought out clearly the need for extensive research in solving the fuel problem and the combustion chamber design. We currently inspect combustion chambers every 100 hours and it is necessary to replace some stainless steel liner sections at each inspection. The time required to inspect and replace sections has, however, been reduced to a tolerable period. Fuel atomizing nozzles are replaced every 50 hours at present because of short-lived synthetic seals in the spray heads. Again this situation is tolerable from the standpoint of servicing time, but leaves room for improvement.

"To obtain additional data on the effects of fuels on combustion chambers, air nozzles and turbine blades, the gas turbine electric locomotives have been operated on straight diesel fuel, a heavy diesel fuel, a low ash residual fuel, and a special grade of desalted Bunker C fuel. All four turbines are currently using the special grade of Bunker C fuel which has been desalted and treated to meet a ratio of vanadium, sodium and calcium requested by General Electric. This special fuel is slightly higher than the regular Bunker C fuel and requires special handling and facilities.

"Since the use of the gas turbines in gas pumping service, using natural gas for fuel, has given excellent performance and parts life, we are considering the possibility of burning propane gas in one of the locomotives.

"The locomotives are considered as undergoing an accelerated service test and every reasonable effort is being made to reduce out-of-service time. Only the regular train crews are riding the locomotives, but experienced men board the locomotives on arrival at the terminals, check over the work to be done, and are ready to instruct servicing forces on the necessary work as soon as the locomotives arrive at the service pit. At the pit, the locomotives are given a running gear inspection while being fueled, sanded, watered, and cleaned. All inspection and supervision is gradually being turned over to the normal forces. It is expected that operating and maintenance forces will require time to become acquainted with all of the equipment which these locomotives contain and as most of you know experience with new equipment must be gained the hard way.

"Most of the engine crews prefer assignment to a turbine rather than a steam locomotive. There are, however, a few men who are hesitant about working with new machinery.

"There have been very few complaints of excessive noise and actually there is less noise in the cab of the gas turbine than in a diesel locomotive. Also, the noise from the gas turbine does not seem to carry as far as that from the diesel. There has been no indication of trouble in tunnels or in any other way due to heat from the exhaust stack gases."

F. W. Beichley, engineering supervisor, Engineering and Service Department, Westinghouse Pacific Coast, reporting on the Westinghouse-Baldwin gas-turbine locomotive, said that its operation on the Pennsylvania was concluded on March 29 after making 27 round trips between Altoona, Pa., and Harrisburg in six weeks on two mail trains which operate non-stop on this 131-mile run five days a week on a schedule of 2 hrs. 40 min. running time. During these runs the trains averaged 29 cars westbound and 25 eastbound. Ordinarily they are powered by two Pennsylvania K-4 steam locomotives.

"Maximum speed limit for these runs," Mr. Beichley said, "was 70 m.p.h.; on several occasions the run was made in 2 hrs. 22 min., which is the scheduled time of the best train on this division. In the six-weeks' period, each run was completed on or ahead of schedule except for times when train detentions occured due to railroad-operational tieups. No detentions were attributed to gas turbines or electric drive. Routine maintenance was conducted after daily runs, enabling the locomotive to handle 93 per cent of the trains to which it was assigned in the six-weeks' schedule.

"After a few initial trips on diesel fuel for convenience and observation," Mr. Beichley continued, "runs were begun on residual fuel, after which diesel oil was used principally for hostling the locomotive with the auxiliary diesel engine-generator set and to start and shut down the gas turbines. On the basis of 93½ per cent of fuel used being residual, westbound runs averaged 3.9 gal. of fuel per thousand gross ton-miles. Eastbound runs averaged 3.5 gal."

Much favorable comment on the riding characteristics of the locomotive throughout its speed range, Mr. Beichley said, has been received from those who have ridden the locomotive with the new trucking arrangement.

The locomotive is now on the Missouri-Kansas-Texas where it began service on April 18 by pulling a revenue 74-car fast freight of 3,000 tons from Parsons, Kan., to Denison, Tex., making the required schedule.

At Denison, according to Mr. Beichly, the locomotive entered regular revenue passenger-train service between Denison and Parsons, pulling an average consist of 11 mixed passenger and mail cars on a round trip basis of 550 miles per operating day. The train from Denison to Parsons is a frequent-stop service taking 6 hrs. 45 min. Parsons-Denison is a few-stop run of 5 hrs. 30 min.

"As in the PRR operations," Mr. Beichley said, "diesel fuel was initially used with conversion to No. 6 residual the second week, after which diesel fuel was ordinarily used only for starting the turbines and purging the system before stopping. Operational procedure is to move the locomotive to the station on its auxiliary diesel, starting the turbines 5 min. before train time.

"Operation on the MKT has been excellent." From Denison to Parsons "as many as 32 stops have been made and still kept schedule." From Parsons to Denison, with few stops, "the locomotive may be brought up to 75 m.p.h., after which speed may be maintained for 20 to 30 miles with three-quarter throttle or less and an 11- or 12-car consist.

"As of June 8, 19,800 miles and 543 turbine hours had been accumulated in MKT service. In recent weeks, an average of 85 per cent of the fuel used has been No. 6 residual oil. Including initial operation on diesel fuel, average consumption has been 6.9 gal. per mile in this type service. The fuel costs of gas-turbine locomotive operation are, of course, dependent on the percentage of residual fuel burned.

"This locomotive incorporates a wast-heat boiler on one of the turbines. This has been in use supplying the major part of all steam for the train as well as heating all of the No. 6 oil for both turbines. Despite relatively high ambient temperatures, reducing steam requirements, we have been pleased with the appreciable savings effected by using turbine exhaust heat for steam."

(The report was accepted and recommendations referred to letter ballot.)

Arbitration Committee

The following principal changes were recommended:

Modification of the second paragraph of Section (c) of Rule 2 and the second paragraph of Section (a) of Rule 86, to indicate that the maximum quantity of regulatory commodities loaded in tank cars must be governed by the limitations as provided by I.C.C. regulations.

Based on recommendation of the Committee on Car Construction, addition of new Note following Section (b), Paragraph (8) of Rule 3 and modification of Section (m) of Rule 17 to avoid the use of brake beam safety supports which are difficult to properly maintain and which are frequently found defective. This committee recommended to the committee on car construction that its present review of the existing list of approved equivalent designs of brake beam safety supports be expedited with the view of withdrawing approval from all designs which have not been giving satisfactory service.

With the concurrence of the committee on tank cars, elimination of Paragraph (t) (11) of Rule 3 to provide relief to car owners in testing of safety valves or tanks of tank cars which are due for test within 30 days.

Modification of the second Paragraph of Rule 16 to eliminate the possibility of railroads doing improper caulking of seams and rivets on tanks of tank cars.

Based on recommendation of the committee on couplers and draft gears, modification of Sections (i-1), (i-6) and Note following (i-6) of Rule 17, Interpretation No. 7 of Rule 88 and Interpretation (c-7) of Rule 122, account addition of new Note 5 to Rule 101 covering authorized applications of National Rubber Cushioned Type MF-260 draft gears.

Modification of Section (a) of Rule 61 to insure better maintenance of truck details.

Contingent upon approval by the general committee, modifications of Rules 71, 75 and 82 to provide for the removal and condemnation of cast iron wheels having conditions which contribute to accelerated wear of truck parts and other defects, as well as to development of hot journals.

With the concurrence of the committee on wheels, elimination of Note 3 of Rule 73, to prevent unnecessary shopping of cars in train yards having wheels partly worn but not condemnable by gage.

Modification of Interpretations No. 3 and 5 of Rule 91 to clarify the intent and bring same in harmony with the intent of Paragraphs (b) and (c) of this Rule.

Modification of Rule 94 and Section A of Rule 112 to discourage the practice of unnecessarily cutting up badly damaged foreign and private line cars to facilitate handling and account failure to return trucks where owner requests return of car home for repairs.

Modification of Items 169-E to 169-I of Rule 101, based on results of joint study by a special subcommittee composed of members of the arbitration committee and the committee on prices for labor and materials made on nine railroads and one private car line.

Modification of Paragraph 4 and addition of new Paragraph 5 to Section B of Rule 112 to provide an equitable basis for settlement for refrigerator cars destroyed which are equipped with mechanical refrigeration.

With the concurrence of the committee on brakes and brake equipment, addition of new Section (j-3) of Passenger Car Rule 7 to insure the maintenance of hand brakes on Passenger equipped cars in operating condition.

The committee did not feel that any of the modifications included in its report necessitated submission to letter ballot.

Members of the arbitration committee are: J. A. Deppe (chairman), superintendent car department, CMStP&P; W. N. Messimer (vice-chairman), general superintendent of equipment, Merchants Déspatch Transportation Corporation; H. M. Wood, assistant chief of motive power (car), PRR; R. M. Smith, vice president, Union Tank Car Company; R. E. Baker, assistant general manager (mechanical), B&M; H. L. Price, mechanical assistant, AT&SF; A. H. Gaebler, superintendent car department, General American Transportation Corporation; and E. P. Stemshorn, assistant chief of car equipment, CNR.

(The report was accepted.)

Passenger Car Specifications

Standard Floor Plans

One of the many serious problems confronting the railroads the last few years is the very great increase in cost of new passenger equipment cars. Your committee was instructed to work with a committee from the American Railway Car Institute to develop plans for various basic types of cars which could be standardized and therefore more economically produced.

Nine basic plans were agreed upon and submitted to the General Committees of the Operating-Transportation and the Mechanical Divisions. These General Committees approved the plans and submitted them to the Board of Directors of the A.A.R. who at their Meeting of November 16, 1950, unanimously approved the proposed floor plans for submission to the Member Roads as recommended practice. Prints of these floor plans were included in the bound and indexed book of "Drawings for Railway Passenger Car Standards" issued by the A.R.C.I. Passenger Car Committee which was sent to the executives of member roads with Mr. Faricy's letter of August 22, 1951.

There are 19 floor plans involved, four coaches, three coach combinations, three parlor car and parlor-car combinations, a diner and a diner lounge, and seven baggage and non-passenger baggage combinations.

The committee recommends that these floor plans be approved as Recommended Practice for inclusion in Section C of the Manual of Standard and Recommended Practices.

The committee decided at its joint meeting with the car builders' representatives on February 28, 1952, that it was inadvisable to attempt to standardize details of cars, such as alternators, lavatories, hand brakes, door holders, fans, etc. Dimensions of such details, method of mounting, etc., would inevitably be selected from particular suppliers' products to the possible exclusion of others. This might also have a tendency to stifle development of improvements is such details.

Designations and Definitions

Specifications for the construction of New Express and Baggage Cars used in Messenger and Baggageman service were adopted as Recommended Practice in 1948 at which time a three-phase program was also adopted to make available for this service as many cars as required in the shortest practicable time limit. These three phases were: (1) construction of new cars in accordance with the specification; (2) shopping of existing cars to modify them as necessary to make them meet the specification requirements; (3) take immediate steps to correct the required number of cars to meet the most important specification items without waiting for shopping of the cars.

In order to readily identify cars which had been made suitable for messenger service, these cars were stenciled with a 6-in. five-point star directly under and centered on the Railway Express Agency marking. This star identification was also adopted by Letter Ballot in 1949.

In view of the above, it is now recommended, as a letter ballot proposition, that these cars be designated "BEM" (Baggage Express Messenger) and that the description of same be added to Page L-11 of the Manual between the designations "BE" and "BH."

Proposed Standardization of Floor Plans In the Construction of Sleeping Cars

The American Railway Car Institute Committee on Passenger Car Design, consisting of representatives of the American Car and Foundry Company, Budd Company, Pullman Standard Car Manufacturing Company and the St. Louis Car Company, has been working on the development of floor plans for sleeping cars and at a joint meeting with your committee, held on February 28, 1952, presented a preliminary statement consisting of 13 points which include floor plans and related details for such cars. These are now being studied by your committee with the view to further discussion of this matter at another joint meeting.

The members of the committee are R. H. Graff (chairman), assistant engineer car equipment, NYC System; R. B. Winship, mechanical engineer, CPR; H. L. Price, mechanical assistant —cars, AT&SE; C. K. Steins, mechanical engineer, Pennsylvania; V. L. Green, assistant superintendent car department, CMStP&P; M. C. Haber, research and standards engineer, UP; G. J. Lehnerer, superintendent car department, IC system; H. W. Reynolds, mechanical engineer, N&W; F. J. Herter, special engineer, C&O; H. L. Holland, assistant mechanical engineer, B&O; W. Scowcroft, car equipment engineer, Pullman Co.; L. C. Bowes, electrical engineer, CRI&P; H. J. Dawson, traveling electrical supervisor, I.C.; W. M. Keller, director mechanical research, Mechanical Division, A.A.R.

(*The report was accepted.*)

Brakes and Brake Equipment

The committee made recommendations, as follows:

A gage for condemning AB cover gaskets having an overall thickness of less than 0.175 in. including bead, when valves receive periodic attention in accordance with Pamphlet No. 2391. This is a letter ballot item and, if approved, appropriate changes will be requested in Manual and Interchange Rules.

Brake Equipment for High Tare Weight Freight Cars

The committee recommended, as a letter ballot item, that the following be added to page E-13-51 of the Manual as Standard to cover Brake Equipment for High Tare Weight Freight Cars and Cars of Special Design:

"Cars having tare weight too high to permit use of AB-10 single capacity freight brake other than those requiring two (2) complete sets of AB-10 equipment, shall be equipped with a single capacity AB brake, including a 12 in. x 10 in. UAT type brake cylinder to operate at 5 in. piston travel (including the use of an automatic slack adjuster), and a badge plate specifying the 5 in. piston travel shall be applied to each side of such cars at a suitable location. All other components of the brake equipment, including retaining valve, shall be the same as for standard AB-10 single capacity brake."

Reason: To provide proper brake equipment for freight cars of high tare weight.

Air Date Stenciling on Tank Cars

The committee recommended to the Arbitration Committee that Paragraph (f) of Rule 60 be revised as follows:

PROPOSED FORM—(f) All old cleaning marks must be scraped off and painted over with quick-drying paint, preferably black. The place, month, day and year of cleaning and the railroad or private line reporting marks, must be stenciled with white paint on the auxiliary reservoir, as shown on pages 136 and 137, or if this location does not present a clear view from outside of car, the stenciling should be located near handle of release rod on the reservoir side of car. *On tank cars, this stenciling must be located on reservoir side of center sill as close to B end of car as possible.*

Reason: To avoid obliteration of air brake cleaning date markings caused by spillage of certain commodities.

P.C. Rule 7—Periodic Inspection and Lubrication of Hand Brakes

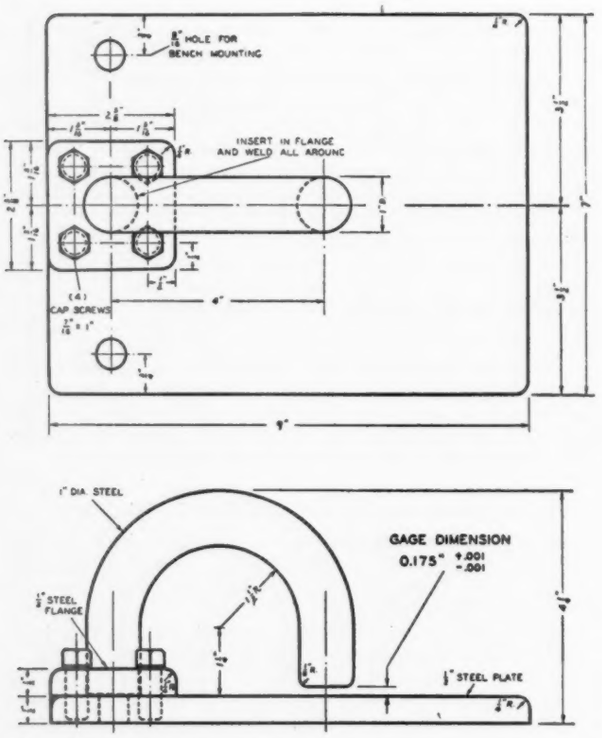
In order to insure the maintenance of hand brakes on passenger equipment cars in operating condition, it was decided to recommend to the Arbitration Committee that new Section (n) be added to P.C. Rule 7 to read as follows:

"(n) When car is on shop or repair track for cleaning of air brakes, the hand brake mechanism and connections must be inspected, tested and lubricated, to insure their suitability for safe and effective operation. No charge is permissible for this work. However, charge may be made for any repairs or renewals of details found necessary and performed."

Securing of Brake Cylinders, Auxiliary Reservoirs and Pipe Clamps

The committee recommended, as a letter ballot item, that the first paragraph under "Miscellaneous" shown on Manual page E-13-51, be revised as follows:

PROPOSED FORM—Bolts securing brake cylinders, reservoirs and



Gage for worn AB valve cover gaskets

pipe clamps shall have double nuts, *single nut with locking feature, or single nut in combination with lock nut* or nut lock, preferably the latter.

Reason: To provide for the use of a single nut with locking feature and single nut in combination with lock nut.

The committee also reported on (1) the progress of tests on 33 Illinois Central cars with QRR brake cylinder release valves; (2) on a test of 25 Illinois Central cars with load compensating brake; (3) on a demonstration of circuit checking devices for electro-pneumatic brakes; (4) on the status of rules revisions governing the maintenance of brake and train signal equipment.

Changes in Specification No. 2518

The air brake companies, with the approval of the Brake Committee, have made certain changes in Specification No. 2518, in order to clarify the questions relative to the location of the reservoirs and AB pipe bracket, to provide flexibility in the pipes in case of any movement of the bracket or reservoir and to reduce the possibility of pipe leakage. Also, a table was added to show a minimum recommended radius bend for pipes used on the AB air brake equipment.

A revision was also made in the instructions for the application of the flanged Wabcoseal fittings.

The report concluded with a list of nine additional items under consideration.

The report was prepared by a committee of which J. P. Lantelme, assistant engineer, PRR, was chairman.

Discussion

The discussion of brakes and brake equipment centered about brake pipe leakage with particular reference to loss of air at AB cover gaskets. A representative of one road said that the present rule requiring the replacement of back covers with the new reinforced type is costing the railroad $26,000 a year and they have developed a relatively inexpensive stiffener which can be applied to prevent warping at $1.30 each. The need for effective means to charge full trains of AB equipment quicker was emphasized again at the meeting this year.

Another speaker said that leakage is not all in the AB valve by any means and that a check on one road showed 64 per cent of the leaks in the train line. He said that Rule 101 was not being lived up to and that better train yard inspection is needed.

(The report was accepted and recommendations referred to letter ballot.)

Report on Geared Hand Brakes

As of the date of this report, A.A.R. Certificates of Approval have been issued for a total of 31 types of geared hand brakes—19 vertical wheel type, 9 horizontal wheel type and 3 lever type. These were listed in the report and Interchange Rule 101 will be revised to show additional types not now included, together with changes in references as required.

Detachment of Brake Wheel Because of Worn Threads

It is recommended, as a letter ballot proposition, that Paragraph 3 of the Specification for geared hand brakes (Manual Page E-61) be modified as follows:

Proposed Form—Depth of wheel hub to be 2⅝ in. with square taper fit on shaft, taper 2 in. in 12 in., outside end of shaft to be 15/16 in. square. Wheel to be secured to shaft with not less than ¾ in. standard nut with lock nut or cotter, *or nut with self-locking feature plus cotter,* or end of shaft riveted over.

Reason: To provide for the use of nuts with self-locking feature.

It was also recommended, as a letter ballot item, that Paragraph 9 of the Specifications for geared hand brakes (Manual Page E-62) be modified as follows:

Proposed Form—Quick release feature may consist either of an arrangement operating independently of the brake pawl, or by operation of ratchet operating lever which can be forced into release position by hand. When quick release can be affected by either method, hand wheel should preferably not revolve in counter clockwise direction. *Graduated controlled release feature by action of the release lever when lift the load feature is incorporated, may be used.*

Reason: To provide for graduated controlled release feature by action of the release lever.

Letter Ballot Items

The following recommendations contained in the report are to be submitted for adoption by letter ballot vote:

1. Revision of Paragraph 3 of the Specifications for Geared Hand Brakes to permit the use of wheel shaft nut with self-locking feature plus cotter.
2. Revision of Paragraph 9 of the Specifications for Geared Hand Brakes to permit graduated controlled release feature by action of the release lever when lift the load feature is incorporated.

The report was prepared by a committee of which H. B. Wolfe, engineer construction, AT&SF, was chairman.

(The report was accepted and the recommendations referred to letter ballot.)

Axle and Crank-Pin Research

Progress Reports

Quenched and Tempered Carbon Steel Axles

The results of fatigue testing axles to Specification No. M-126-49, Classes G and H, were included in the Eighth Progress Report, issued by the Mechanical Research Office under date of February, 1950. Substantiating data on additional axles to Class H specification verify the maximum allowable stress values previously reported for these axles.

Data were also presented on axles to Specification No. M-126-49, Class G, modified by water quenching from the tempering temperature of 110 deg. F. This additional treatment increased the resistance to breaking off in the wheel fit by 50 per cent above that obtained on Class G axles.

Experimental Design Freight Car Axles

Fatigue tests on axle forgings with wheel-seat diameters same as the standard passenger car axles, but having as forged surface between wheel seats, have been substantially completed. This portion of the study of development of a new design of freight car axle indicates that the project is feasible. These tests are being continued and will be supplemented by a series of tests on the present standard (black collar) freight-car axle, to compare the fatigue strength of the as-forged body on the two designs.

Assignments

Assignments before the committee include study of the design of a tubular axle with raised wheel seat.

Two-step journals for roller bearings on trucks with integral journal boxes have been approved by the committee, but the manufacturer has supplanted this design with a straight cylindrical journal using a single inner race diameter for both bearings.

The committee continues the study of coating materials to protect the body of axles from corrosion fatigue.

The return to service of severely burned axles without proper safeguards and observance of existing rules is potentially dangerous. But arbitrary scrapping of all axles which have been overheated could not be economically justified. The committee believes that strict observance of Rule 355 (o) of the Wheel and Axle Manual by all railroads would automatically remove from service any axles which had been "severely burned." It recommends that the executive vice-chairman of the Mechanical Division circularize member roads calling attention to the many burned off journals resulting from non-compliance with existing rules. It also proposes for letter ballot action that all axles with overheated journals reconditioned in accordance with the provisions of the current rules be identified by stencil.

Tests to determine dynamic stresses in axles showed no indication of high stresses in journal at ordinary running temperatures.

Tests to determine permissible throw or run out at center of unmachined axles indicate that a change from allowable limit of ¼ to ⅜ in. would have no appreciable effect on lading.

Crank-Pin Fatigue Tests

Summarized data from the completed fatigue tests of carbon-steel and alloy-steel steam-locomotive crank pins will be submitted to the Committee on Locomotive Construction for approval with a view to revising Plate 1, page 5, Section F, of the Manual of Standard and Recommended Practice.

The members of the committee are W. M. Keller (chairman), director mechanical research, Mechanical Division, A.A.R.; K. Cartwright, general mechanical superintendent, NY, NH&H; W. F. Collins, engineer tests, N. Y. C. system; H. I. Decker, assistant mechanical engineer, Pennsylvania; H. H. Haupt, general superintendent motive power, Central Region, Pennsylvania; F. J. Herter, special engineer, C&O; A. M. Johnsen, engineer of tests, Pullman Co.; E. J. Johnson, assistant chief engineer equipment, NYC System; E. H. Weston, assistant chief mechanical engineer, C&NW.

Discussion

The committee's recommendation that such axles reconditioned in accordance with Rule 355(o) of the Wheel and Axle Manual be identified by stenciling, was said in the discussion not to be adequate because it misses the axles which are rebrassed on the road, perhaps after cooling by quenching with water. The experience of some members that a high percentage of failed journals are found to have been turned down indicates reconditioning after overheating.

A study of overheated axles on the Pennslyvania revealed that, when Magnafluxed, 90 per cent were found with cracks too deep to be removed by turning. It was suggested, on the basis of this experience, that it would be more economical to scrap all the axles than to Magnaflux all and reclaim the 10 per cent. Another factor affecting the reclaimability of axles, the journals of which have been heated until the bearing metal has been melted out of the brass, is the effect of copper penetration which seems to weaken the steel by destroying its inter-crystalline bond. Acceptance of this as a definite effect of the contact between the hot journal and the brass bearing shell is growing.

(The report was accepted.)

Lubrication of Cars and Locomotives

The service testing of new greases has proceeded without interruption on the railroads of the Lubrication Committee members and conditional approval has been given the Richfield Oil Company for two greases which have performed satisfactorily in passenger service in various makes of bearings with mileage records from 100,000 to 300,000. The list of approved roller bearing greases is as follows:

Lubrico M-1 Special.....Master Lubricants Co.
H-927 Non-Fluid Oil.....New York & New Jersey Lubricant Co.
No. 979 Roller Bearing Grease.....Texas Oil Company
Rocolube R. R. Grease (Note 1).....Richfield Oil Company
Richfield HSRB Grease (Note 1).....Richfield Oil Company

Note 1: Conditional approval given until 350,000 miles is satisfactorily attained in all makes of roller bearings.

In addition to the greases listed as having the approval of your committee, at least 20 other brands are undergoing service tests or have been discarded for reasons of instability, incompatibility with other approved greases, or other inadequacies. One brand not listed above is nearing successful completion of service tests and it also will be considered for conditional approval this year.

The road service testing of greases is considered a necessity until the proposed A.A.R. Specification for journal roller bearing grease can be developed to cover the intangible properties of a product of this nature. The subcommittee is working with a joint committee representing the major oil companies and roller bearing manufacturers which, since its organization in 1950, has reviewed the existing laboratory test methods for interpretation of resulting test data. New test methods, in varying degrees of development, will be available and may be utilized by the A.A.R. in future issues of the grease specification.

Packing Retainer Devices—Spring Type

During the year recommendations made by the Lubrication Committee to the Arbitration Committee included the proposed modification of Interpretation No. 4 of Rule 66 in the 1952 Code.

The committee's attention was directed to a number of cases where serious damage to journals and journal bearings was caused by contact with and displacement of spring type packing retainer devices in separable bolted type journal boxes. It was reported that displacement of spring packing retainer devices in such boxes is primarily caused by excessive wear on the inside of journal boxes in combination with wear on journal bearings, wedges and journals, causing excessive movement from brake applications or impacts and subsequent displacement of packing retainer devices. Your committee felt that these conditions cannot be controlled so as to avoid displacements of this nature.

It was decided, therefore, to recommend to the Arbitration Committee that the use of spring type retainers in separable boxes of bolted type in freight service be prohibited and a new note was added to Interpretation 4 of Rule 66 by the Arbitration Committee in the 1952 Code.

PACKING RETAINER DEVICES APPROVED FOR ROADS DESIRING TO USE THEM

Spring Types	Manufacturer	Design	Suitable for Integral type journal boxes without cast-in retainer ribs	Suitable for Integral type journal boxes having cast-in waste retainer ribs
Hold-Rite Packing Retainer	Spring Packing Corp.	NP-8	Yes	No
Hold-Rite Packing Retainer	Spring Packing Corp.	NP-9 & 10	Yes	No
Hold-Rite Packing Retainer	Spring Packing Corp.	NP-9 & 10 short	No	Yes
Hold-Rite Packing Retainer	Spring Packing Corp.	NP-11	Yes	No
Hold-Rite Packing Retainer	Spring Packing Corp.	NP-11 short	No	Yes
Hold-Rite Packing Retainer	Spring Packing Corp.	NP-12	Yes	No
Modern Packing Keeper	Modern Railway Devices, Inc.	8-9-10-11-12	Yes	No
Union Waste Retainer	Union Spring and Mfg. Co.	9 and 10	Yes	No
Union Waste Retainer	Union Spring and Mfg. Co.	11	Yes	No

Fig. 1—The box is mounted on the stand at the same height as a journal box on a car.

Fig. 2—The top half of the box is hinged so that it may be swung to one side.

Flex-Pak Container

The application of the Hulson Flex-Pak has been extended to 1,000 70-ton hopper cars on the Pennsylvania Railroad, 300 70-ton covered hopper cars on the Baltimore and Ohio Railroad, 50 70-ton gondola and ore cars on the Reading, and a small number of Flex-Paks are running in 50-ton box cars in special service. Reports to date are entirely satisfactory. The first of the 1,000 70-ton hopper cars on the Pennsylvania have now seen better than nine months service through severe winter conditions without reportable difficulty.

The compound of the synthetic oil-resistant rubber has been revised and tests have been made on both stationary plants and in actual impacts. In break-away tests temperatures as low as 71 deg. F. below zero have been recorded with perfect lubricating conditions. In impact tests actual boxes have been frozen to 40 deg. F. below zero and impacts to 8.6 miles per hour recorded with no damage to the Flex-Pak. Twenty-five cars in head-end express service are coming up for their fifth journal box inspection and brass change. The handling of the Flex-Paks has been satisfactory with less than 2 per cent replacement of the Flex-Paks required in this time. Flex-Paks are available in the three sizes for both integral and separable boxes and are all approved for roads desiring to use them in regular interchange service.

Anti-Waste Roll Ledge

Your committee has the assignment of making inspections of cars equipped with the Hogan Anti-Waste roll ledge, to determine the merits of this design of journal box in preventing the rolling of journal box packing.

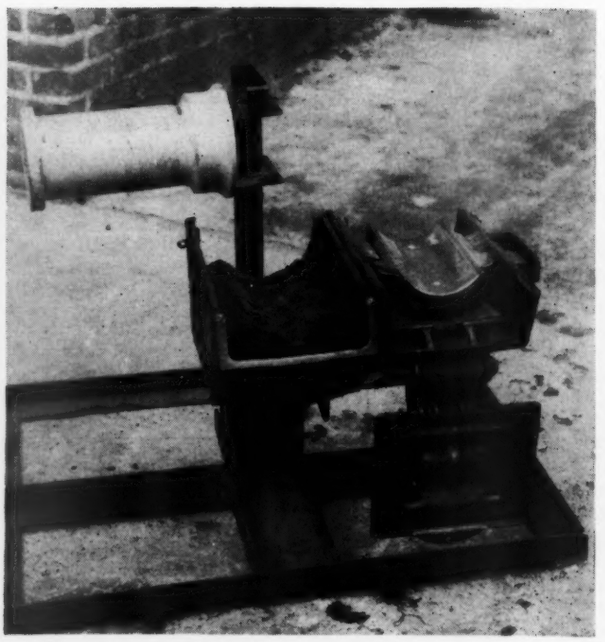


Fig. 3—After the hinged top is swung out, the journal may be lifted and turned to one side to completely expose the packing.

The New Haven Railroad has 500 box cars and 200 flat cars so equipped and advice was received last year from this road to the effect that 550 hopper cars of 70-ton capacity have been ordered to also be equipped with this feature.

The New Haven Railroad was requested to cut one of these design journal boxes from a side frame and forward it to M. A. Pinney, engineer of tests, Pennsylvania Railroad, for use in laboratory tests at low temperature to determine the merits of the design in preventing the rolling of journal box packing. This has now been done and tests as outlined above will be made for the information of your committee.

(The report here included reference to laboratory studies of journal lubricating materials, tentative new specifications for new and renovated oil, joint meetings of the committee with the Machined Waste Institute, approval of reclaimed waste from diesel engine fitters only if it meets Specifications E-M-910-50 and elimination of pages L-81 to L-91 from the A.A.R. Lubrication Manual.—Editor.)

Laudig Iron-Back Journal Bearing

As mentioned on page 36 of the 1951 Annual Report of this committee, road service tests of the Laudig iron back journal bearings were conducted throughout the year under the jurisdiction of your committee and the Mechanical Research Office.

Based on the results of such road service tests, it is now recommended, as a letter ballot proposition, that the Laudig iron back journal bearing be adopted as an alternate to the present A.A.R. Standard Specifications for lined journal bearings now covered by Specifications M-501-48. If this recommendation is approved by letter ballot, the matter will then be submitted to the Specifications Committee for preparation of suitable Specification to cover this new type journal bearing.

Although Laudig iron back bearings were developed to overcome the difficulties of "burned off" journals, it is claimed that tests have shown it has additional qualities for better service, as follows: (1) The bearing is made of a high strength back, thus more uniformly distributes the load of the car over the length of the journal; (2) the bearing having high strength and rigidity, shows great reduction in spread linings; (3) the bond of the babbitt to the back or shell of the Laudig bearing is not reduced or lost at operating temperatures prevailing with heavy loads and summer temperatures. Loose linings are eliminated.

Inferior Quality Journal Bearings

Based on reports from certain railroads with respect to the inferior condition of journal bearings received from the producers in some instances, your committee recommended that the Executive Vice-Chairman communicate with the solid journal bearing manufacturers stating that the railroads are concerned over the relatively high number of new journal bearings being received having defects which would be cause for rejection and that this would indicate some loose practices within the industry.

In handling this matter with the manufacturers, it was also recommended that mention be made to the effect it is the feeling of railroad representatives that some action should be taken to eliminate the high number of rejects, and, if no improvement is shown, action will necessarily have to be taken to have railroad inspectors destroy or in some manner deface bearings rejected.

Consideration was given to initiating action to require individual railroads initials to be cast on all bearings; also to a requirement to enable defacing of the letters "AAR" on rejected bearings. These proposals, however, are held in abeyance for the time being pending results of handling this matter with the manufacturers.

To date, replies have been received from a number of journal bearing producers and full cooperation has been promised.

Empire Journal Lubricator Device

Up to April 30, 1952, a total mileage of 1,398,771 has been made on six different railroads of cars equipped with the Empire Journal Lubricator. The success of this device prompted your Committee to instruct the secretary to advise that the Empire Journal Lubricating Device may be made for experimental application to cars which move in general interchange service, not to exceed 1,000 cars so equipped. In granting such approval it is understood that installation will be made in accordance with Drawings G-100, R-100 and S-101, including the use of grooved journal bearings. Furthermore, the committee requested copies of prints covering the type of closure used in front of journal box to retain lubricating material. All installations made on the above basis are to be reported to the secretary for further handling. This action is in accordance with the policy established by the General Committee at a meeting held on November 23, 1951.

It has been found with the use of this device that a low pour point grease gives excellent results and compares favorably with standard A.A.R. journal box oil.

Hennessy and Jeffers Lubricators

Laboratory tests of both the Hennessy and Jeffers lubricators have been made at the Indianapolis Lubrication Laboratory under the jurisdiction of the Mechanical Research Office and reports with respect to same have been furnished to your Committee. The laboratory tests indicated that these lubricators can be rated as having possibilities as satisfactory devices for the lubrication of conventional railway equipment solid journal bearings.

Your committee decided that road service tests of a sufficient number of these lubricators should be conducted on individual roads to establish the mechanical reliability and overall economics of same as a basis for approval of their use under cars in interchange service. Data has now been submitted by both companies indicating installations and service mileage and performance as applied to railroad equipment on individual roads and at the time of preparing this report consideration was being given to the matter of authorizing a limited number of installations of these devices to cars which move in general interchange service.

Journal Box Packing Instruction

On page 47 of the April 14, 1952, issue of Railway Age, there appeared an article with accompanying photographs describing a device used to good advantage on a southeastern railroad for the purpose of instructing railroad employes as to the proper method of repacking and service treating journal boxes.

Your committee has reviewed this article and feels that such educational programs, particularly where a device of this nature is used, are beneficial and should be given due consideration by all roads who have not already adopted such instruction methods in the interest of combating the hot box problem.

Referring to the illustrations, it will be noted that the top of the box is hinged so that it can be opened and the condition of journal box packing inspected after box is repacked or service treated. The journal can then be raised and swung out of the way so that a complete view of the packing is available.

The usual procedure is to instruct a box packer to pack this model box, which is set up for normal operations, and the box is then opened so that the employee can see for himself how well the job is done. This road reports that during demonstrations held with the first of these models, it was surprising to learn how many men were astonished to see what were the actual results in a job which they had assumed to be well done.

The report was signed by R. E. Coughlin (chairman), chief metallurgist and engineer tests, C&NW; E. H. Jenkins (vice-chairman), assistant general superintendent car equipment, Western Region, CNR; F. L. Morrison, general air brake engineer, IC; D. C. Davis, lubrication supervisor, AT&SF; M. A. Pinney, engineer of tests, PRR; H. T. Rockwell, assistant engineer, NYC; M. A. Hansen, engineer of research, GM&O; F. Fahland, general mechanical engineer, UP; Robert Schey, general superintendent car department, NYC&StL; L. N. Griffith, assistant mechanical engineer, SP; W. R. Petry, chemist, GN.

Discussion

A cross section of the comments made by four speakers from the floor in the discussion following the presentation of the Lubrication Report was that we still have with us the age-old problem of hot boxes and that the situation is getting "no better fast." The major factor, said one member, in this hot box problem is the rough handling that freight cars get in train yards and that nothing much is being done about it either by mechanical or operating departments. The conclusion of the comments was that one of the principal underlying causes of hot boxes is the failure of the roads to carry out the instructions of the A.A.R. in the matter of packing journal boxes.

(*The report was accepted and recommendations referred to letter ballot.*)

Couplers and Draft Gears

During the past year a detailed investigation has been made to discover the causes of train partings. A total of more than 900 cars involved in partings were carefully inspected. The reports of these inspections are now being tabulated and studied. It is felt that when this study is completed, evidence will be available to show the prevalence of various kinds of difficulties that are directly responsible for or contribute to train partings. Your committee is giving consideration to the preparation of an instruction bulletin for the use of member roads and private car owners to educate employees in what to look for when train partings occur.

An immediate result of these parting investigations was the discovery that the front lug on the bottom of the link over the uncoupling rod bracket of the Standard Railway Equipment Company's "Safety" uncoupling device could, under certain conditions, hold the rod and locklift toggle in partly raised position. This condition was called to the manufacturer's attention and the design was corrected. The secretary circularized all member roads and private car owners on February 7, 1952, advising of this condition and recommended the removal of the front lug by grinding. A photograph accompanied this circular to clarify the condition.

(The committee here recommended adequate attention to couplers and draft gears whenever cars are on the repair track and not limited to the time of periodic air brake attention which may be 36 months with modern AB equipment. It ruled against flame hardening of draft keys.—Editor.)

Coupler Yokes—Operating Rods

The attention of your committee has been directed to the fact that the current A.A.R. Specification M-205-47 covering design test requirements for coupler yokes does not include yokes designed for use with twin cushion draft gears. Yokes of this type are subjected to both tension and compression loads in service whereas the specifications now cover designs which are subjected only to tension loads. Accordingly, consideration is now being given to appropriate revision of the specifications to include yokes of both

types. Arrangements have been made for conducting additional laboratory tests on all yoke designs of the tension-compression type to establish specification requirements which will insure satisfactory performance of the yokes in service.

During the past year the Waugh Equipment Company, in co-operation with the Mechanical Committee of the Standard Coupler Manufacturers, has developed a design of yoke suitable for use with the Type F interlocking coupler and the Waughmat Twin Cushion draft gear in freight equipment cars. Laboratory tests on yokes of this design in both Grade B and high tensile steel, conducted under the supervision of your committee, have been completed and the results are being evaluated.

Improved Coupler—Operating Rod

An improved type coupler-operating rod, developed by the Standard Railway Equipment Manufacturing Company, was recommended for adoption and subsequently approved by letter ballot as an alternate standard for type E couplers. This style of rod was also approved for use with type F interlocking couplers, but because of the difference in the location of the rotor eye of the locklift assembly used in the F coupler and the increased lateral coupler movement required, the same rod and bracket cannot be used interchangeably with E and F couplers. TheF coupler rod is basically the same but of somewhat different shape and the bracket is considerably longer than that required for the E coupler.

A new drawing, Fig. 1, not included in this abstract of the committee's report, has accordingly been prepared to show the fundamental requirements to be observed when the improved type rod is applied to cars equipped with type F couplers. This new plate will be shown in Sec. C of the manual and identified as standard for type F couplers.

Certified Draft Gears

Miner Type A-22-XL, Waugh-Gould Type 420 and Waughmat Twin Cushion Type WM-4-6 conditionally approved draft gears, having fully met all requirements with respect to laboratory tests and service performance, have been granted unconditional approval and will be so listed in the Interchange Rules.

With respect to Waugh-Gould Type 420, some trouble has been reported with these gears with respect to sticking in service. Investigation developed that an error had been made in one of the tolerances shown on a manufacturer's working drawing and this error made it possible for gears to stick when parts were assembled with the most unfavorable combination of maximum and minimum tolerances. Although this error had been called to the attention of your sub-committee as soon as discovered by the manufacturer and corrective action taken, a limited number of these gears got into service prior to discovery of the error. Since the gears having incorrect tolerances bore no special markings, it was not possible to trace and identify them. The manufacturer has given assurance however that should any of these gears be found sticking in service they will be replaced free of charge.

Hulson Type 202 conditionally approved draft gear.—In making service checks of this gear it was found that the variation in springs was such that the initial spring pressure on the friction shoes was not always sufficient to exert enough wedging force to produce the required capacity. Investigation showed that this fault could be corrected by the insertion of a specially designed shim under these springs. After numerous tests, your Sub-Committee approved this shim for application to existing Type 202 gears when required, the gear then to be known as Type 202 Modified.

For Hulson gears manufactured in the future, a new design of spring will be substituted, making the use of a shim unnecessary. Tests were made with gears having these new springs and were found satisfactory. This new gear will be known as Hulson 202-A and with 202 Modified will be listed in Interchange Rules as conditionally approved gears, superseding Hulson Type 202.

The manufacturer has given assurance that if any Type 202 gears now in service are found to be giving trouble, corrective action to the satisfaction of the car owner will be taken promptly. If such gears are modified by the addition of the approved shims, type marking on gear housings should be restenciled to read: "Type 202 Modified."

National Type MF-260 draft gear has met all of the laboratory test requirements of Tentative Specifications for Rubber Draft Gears for Freight Service and has been granted conditional approval. Application has been filed for approval of National Type MF-275, a variation of the National Type MF-260 gear. Laboratory tests will be made as soon as specimens are available.

Applications are pending for approval of three additional types of short draft gears for new cars of special construction, as follows: Waugh-Gould Type 451, National Type MF-290, National Type MF-290-A. The usual special tests will be made and decision reached as soon as specimens are available.

The last of various special service tests of Waughmat Twin-Cushion draft gears was their application to two brine tank refrigerator cars to determine the effect of brine drippings on the rubber and metal elements. In addition to the specified conditions of service, it was found when the cars were located that one of them had been under water for sometime in the Kansas flood last year. The four gears when removed and tested were found to give practically the same performance as when new. The rubber units were in good condition but the metal plates on the car that had been through the flood were considerably rusted, although not to the extent that the action of the gears was affected.

The report was signed by H. W. Faus, chairman, engineer, locomotive equipment, NYC; C. K. Steins, vice-chairman, mechanical engineer, PRR; F. T. James, general superintendent motive power and equipment, DL&W; B. Faughman, assistant works manager, Angus Shops, CPR; J. W. Hawthorne, general superintendent, motive power and equipment, ACL; I. N. Moseley, research and test engineer, N&W; A. W. Maydahl, engineer car maintenance, UP; A. B. Lawson, mechanical engineer, B&O; N. A. Passur, engineer car construction, SP; V. L. Green, assistant superintendent car department, CMStP&P.

Discussion

In discussion of this report, it was suggested that the allowance of a credit for second-hand draft gears be discontinued inasmuch as no tests or specifications are available to check the quality of railroad work in repairing defective gears. The thought was expressed that defective draft gears, after removal, should be shipped to the owner for disposition if desired, otherwise scrapped.

(*The report was accepted and recommendations referred to letter ballot.*)

Committee on Wheels

It is recommended, as a letter ballot item, that the tread and flange contour of the 650-lb. chilled iron wheel, design shown on Manual Page G-2A, be changed by having the tread and flange contour agree with that shown on Manual Page G-3 including the ¾ inch radius at outer edge of rim.

Reason: To agree with other approved standard chilled iron wheels.

Experimental Cast Steel Wheels

It was decided to recommend to the General Committee that authority be granted to manufacture and place in service under interchange freight cars up to 1,000 experimental cast steel wheels with carbon content of 1.50 per cent, as manufactured by Southern Wheel Division, American Brake Shoe Company, the wheels to be marked AAR X2; also, that authority be granted to manufacture and place in service under interchange freight cars up to 1,000 experimental cast steel wheels having a carbon content of 0.75 per cent as manufactured by Griffin Wheel Company, these wheels to be marked AAR X3. In addition, the wheel number and date cast shall be marked on each wheel.

The above recommendation was unanimously approved by the

CAST IRON WHEEL FAILURES AS REPORTED TO THE I.C.C.

Year	Total	Flange	Plate	Rim
Average 1946-1950 Incl.	239	165	48	26
1950	222	170	39	13
1951	198*	145	44	9

*—Includes 3 double plate design and 5 SPNB design cast prior to 1938.

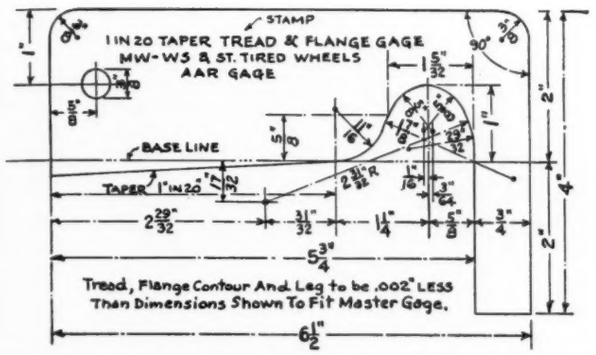

STAMP
1 IN 20 TAPER TREAD & FLANGE GAGE
MW-W3 & ST. TIRED WHEELS
AAR GAGE
BASE LINE
TAPER 1" IN 20"
Tread, Flange Contour And Leg to be .002" LESS
Than Dimensions Shown To Fit Master Gage.

Exhibit B—Gage for determining correct machining of tread and flange contour of M-W wrought steel and steel-tired wheels—A, See Figs. 6 and 6-B. Par. 283.

General Committee and, up to April 1, a summary of wheel service shows some AAR X2 wheels with a maximum of 338,000 miles. Thirty cars have a total of 124 wheels of this type in service and to date have made a total of 1,782,000 miles. Inasmuch as none of these wheels have completed their life an average is not given.

Upon recommendation of your Committee, the Arbitration Committee modified the first note following Sec. (w), Par. (4), Interchange Rule 3 in the 1952 Code to include the word "cast steel" on line 8.

Also, new Par. (c) (8) added to Interchange Rule 98 in the 1952 Code, to read as follows:

"(8) Experimental cast steel wheels marked AARX-2 or AARX-3 when removed from service on account of defect in axle or mate wheel, shall be credited as scrap except when removed on account of Rule 32, 68, or 84 (if wheels are serviceable) condition in which event secondhand credit must be allowed for such undamaged wheel or wheels. All such wheels removed from service for any cause shall be held and disposition requested from car owner. If car owner elects to have wheels returned freight charges collect, shipping instructions must be furnished within thirty days from date of notification. When such wheels are returned to car owner, no credit shall be allowed if the wheels were removed account of owner's defect. If the wheels were removed account of one of the conditions mentioned above, credit to be allowed car owner shall be difference between secondhand and scrap value of cast-steel wheels."

Reason: To provide charges and credits for new design experimental cast-steel wheels, AARX-2 and AARX-3.

(The report here included certain proposed revisions in Specifications M-107 for wrought steel wheels, a suggestion for eliminating chuck marks on this type of wheel, reference to several failures of F-36 design wheels between hub and rim fillets and a requirement that reforged axles, restricted to freight service, be stencilled in letters at least ¼ in. high in locations shown in Fig. 1 of Specification M-101. The committee recommended allowance of a wear limit of ⅛ in. for tubular steel axles and suggested a rule requirement for cleaning and blowing out dirt collected in the hollow portion of the axles due to flood water or other cause. —Editor.)

Gages and Their Uses

Par. 283, Page 183 of the Wheel and Axle Manual, states: "It is advisable to have a template for the correct tread and flange contour which has a leg extending down the back and face of the rim in order to make sure that the total tread contour drop off from the base-line at the throat does not exceed 3/16 in. For tread and flange contours, see Figs. 6 and 6-B." Your committee believes the Wheel and Axle Manuel should illustrate such a template or gage and design as shown in attached Exhibit B. A master gage for checking this gage will be required, as shown in attached Exhibit C (not included in this abstract).

As stated in the 1951 Report of your committee, the standard steel wheel gage, Fig. 122 of the Wheel and Axle Manual, does not condemn high flange at 1½ in., due to the fact that the movable finger when set for high flange, Fig. 128, condemns flange at 1 35/64 in. height.

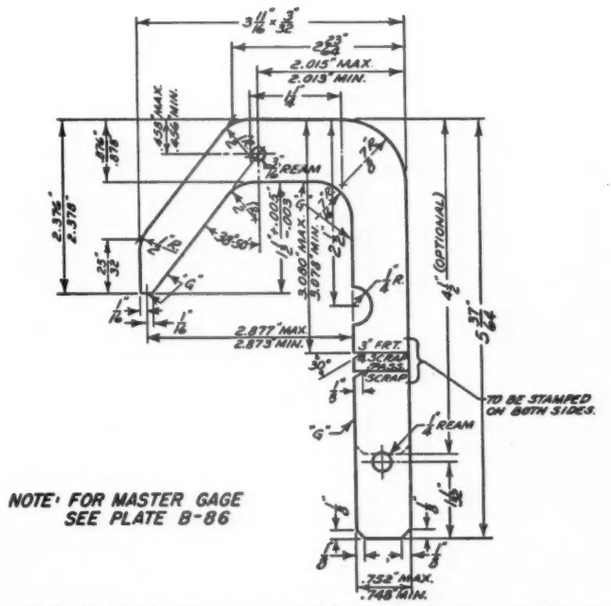


Exhibit E—Condemning gage for 1½" flange height and thin-rim wrought steel wheels.

The design of a standard steel wheel gage to include manufacturing tolerances is shown on Plate B-43 in Sec. B of the Manual. This plate has been modified so that in lieu of using the calibration line between Figs. 6 and 8 on the movable finger when it intersects the top edge of gage (1934 Revision), it will now be effective when the apex of the flange contacts the bottom surface of the horizontal member of the gage. This revised plate is attached as Exhibit D (not included in this abstract of the committee's report).

Attention was directed in the 1951 Report of your Committee to designs of this gage by two member roads for use by car inspectors in coach yards or transportation yards in place of the regular steel wheel gage, Fig. 122 of the Wheel and Axle Manual; the latter gage being more complicated and more expensive.

The matter has been given further consideration and it is recommended, as a letter ballot item, that the design of gage as shown in attached Exhibit E be adopted as Recommended Practice and shown on new Manual Plate B-43-A. It should be understood, of course, that this simplified gage is not intended to replace the standard steel wheel gage, which is necessary for use by forces whose duties require the measurement of service metal in terms of sixteenths of an inch on wrought steel wheels.

Flame Cleaning of Axles

It is recommended, as letter ballot item, that a new third paragraph be added under Rule 221 of the Wheel and Axle Manual to read as follows:

"The best results from magnetic particle testing of axles can be secured when surfaces of axles to be tested are cleaned of rust, oil, paint or dirt adhering to them. In general, these axles can be cleaned by using a rotary wire brush. About ten per cent or less of the axles will have rust, dirt or paint which cannot be removed properly by the rotary wire brush, so it may be considered advisable to flame clean same. In order to properly protect the axle when flame cleaning is used, it must be performed on a machine designed for that purpose and the following is the recommended practice:

(1) Maximum rate of flow of oxygen to burner: 145 cu. ft. per hr. Acetylene: 136 cu. ft. per hr.
(2) Distance of head to work: Surface contact at apex of cone of burner flame.
(3) Minimum rate of head travel: 22 in. per min.
(4) Minimum rotation speed of work: 35 r.p.m.
(5) Design of burner head: 17 orifices of No. 56 drill size in three rows ¼ in. apart with the orifices in each row 9/32 in. apart and staggered.
(6) Flame head must traverse full length of axle between wheel

seats. Automatic cut-off oxygen and acetylene shall be provided in case machine is stopped during flame cleaning process, to avoid the possibility of injury to the surface of the axle.

(7) If necessary to repeat operation, axle must first be allowed to cool to body temperature."

Editorial corrections and other changes recommended by the subcommittees and approved by the Wheel Committee for inclusion in Supplement No. 1 to the current issue of Wheel and Axle Manual appear in Appendix A.

The Committee on Wheels wishes to acknowledge the assistance and cooperation of the Chilled Car Wheel Industry and the Wrought Steel Wheel Industry on subjects handled and discussed with them.

The report was signed by E. E. Chapman (chairman), mechanical assistant, AT&SF; H. H. Haupt (vice-chairman), general superintendent motive power, PRR; I. N. Moseley, research and test engineer, N&W; A. M. Johnsen, engineer of tests, Pullman Co.; M. S. Riegel, assistant engineer of tests, NYC; R. W. Seniff, engineer of tests, B&O; P. V. Garin, engineer of tests, SP; B. C. Gunnell, chief mechanical engineer, Southern; A. M. Guschl, general foreman wheel shop, CMStP&P; A. H. Petersen, superintendent car department, Belt Railway of Chicago.

Discussion

Discussion of the Report on Wheels developed the fact that some failures are giving concern not only to railroads but to the manufacturers. One railroad reported two failures of F-36 wheels in service and a third wheel found cracked which was discovered only after thorough cleaning by sand blasting. The suggestion was advanced that ordinary solvents and cleaners are not entirely satisfactory for cleaning diesel wheels prior to magnetic particle testing. It was maintained that, due to the severity of service conditions under which diesel wheels operate, stress analysis studies should be made with strain gages to determine just what requirements must be met. This is now a prospective A.A.R. research project.

Regarding chilled iron car wheels, it was pointed out that failures have decreased appreciably during the last three years, and apparently will continue to as wheels of older manufacture are taken out of service and replaced by new design chilled wheels. It was reported that 116 of the new cast steel wheels with 1.50 per cent carbon are now in test service and three sets of 20 wheels each, with .75 per cent carbon.

(The report was accepted and recommendations referred to letter ballot).

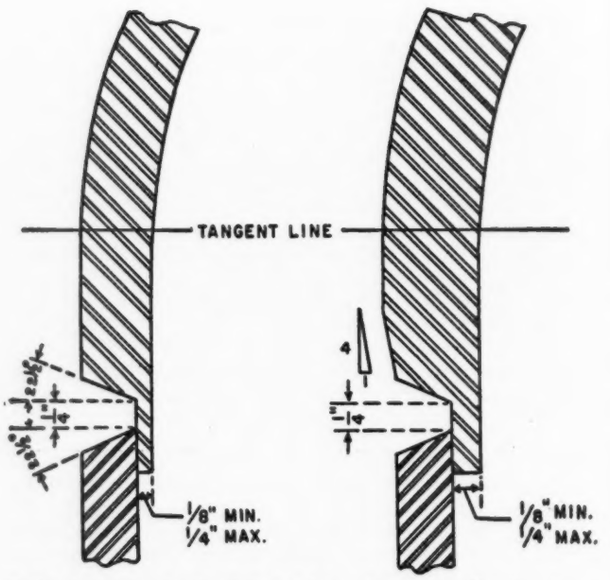
Report of Committee on Tank Cars

During the past year the committee was called upon to give consideration to a total of 405 dockets and applications for approval of designs as follows: 201 covered designs, materials and construction of 7,307 new shipping containers, for mounting on new cars or for replacement on existing cars as shown in the table.

One application covered the construction of six new car structures for the mounting of existing Class ICC-103-W tanks; one covered the construction of one new car structure for the mounting of an existing Class ICC-103A tank; one covered the construction of one new car structure for the mounting of an existing Class ICC-105A300 tank; one covered the construction of 35 tank cars of a proposed ICC-104B-W classification specification; 176 applications covered alterations in, additions to, or conversions and reconditioning of 4,596 existing tank cars or shipping containers.

NUMBER AND CLASSES OF NEW SHIPPING CONTAINERS

Class	No. of Tanks
ICC-103	75
ICC-103-AL-W (Fusion welded seams)	189
ICC-103-W (Fusion welded seams:)	3,141
ICC-103A	1
ICC-103-A-AL-W (Fusion)	2
ICC-103A-W (Fusion welded seams)	485
ICC-103B-W (Fusion welded seams)	95
ICC-103C-W (Fusion welded seams)	3
ICC-104-A-AL-W (Fusion welded seams)	10
ICC-104-W (Fusion welded seams)	357
ICC-104A-W (Fusion welded seams)	2
ICC-105A300-W (Fusion welded seams)	1,416
ICC-105A400-W (Fusion welded seams)	400
ICC-105A500-W (Fusion welded seams)	68
ICC-106A500-X (Fusion welded longitudinal shell seams)	1,053
AAR-201A35-W (Fusion welded seams)	10
Total	7,307



Optional welding for head-shell joints when inside diameter is not over 36 in.

The proposed alterations, conversions, additions or reconditioning operations, affecting the foregoing 4,596 cars or shipping containers, consisted of such items as: Air connections installed; bolster saddles renewed; bottom washout arrangement installed; conversion from ARA-III to insulated ARA-III; dome platform and ladder applied; heater systems installed; manway cover fittings altered; Q-187 Saran rubber lining applied.

Upon recommendation of the committee, concurred in by the Bureau of Explosives, the General Committee approved amendments to AAR paragraphs requirements of specifications Class ICC-103-W, ICC-103A-W, ICC-103B-W and ICC-104-W, with respect to non-destructive test of fusion welded seams.

New Specifications

During the year the committee concluded consideration of proposed specifications Class ICC-103AL-W and ICC-103A-AL-W covering tank cars with fusion-welded aluminum tanks and used for the transportation of flammable liquids or corrosive liquids. The specifications appear as Exhibits A and B (not included in this abstract of the committee report.—Editor.)

During the year, the committee also concluded consideration of proposed spec. Class ICC-110A500-W covering tank cars having metallic-arc fusion-welded tanks and used for the transportation of dichlorodifluoromethane; also spec. Class AAR-205A300-W covering tank cars having fusion-welded steel tanks and largely used for the transportation of nitrogen fertilizer solution. These specifications, presented as Exhibits C and D, are also omitted here.

At meeting held on January 30 and 31, 1952, the Committee on Tank Cars considered and progressed or disposed of 40 special subject items previously docketed.

The report was signed by J. E. Keegan (chairman), chief car inspector, PRR; J. R. Hayden (vice-chairman), superintendent car department, MKT; R. S. Venning, special engineer, C&O; F. J. Harris, mechanical engineer (car), CN; N. A. Passur, engineer car construction, SP; W. Combs, general car foreman, T&P; J. B. Ferrell, general car foreman, TP-MP Terminal R.R. of New Orleans; R. M. Smith, vice-president, Union Tank Car Co.; R. T. Baldwin, secretary, Chlorine Institute; T. H. Caldwell, maintenance superintendent, Dow Chemical Co.; R. W. Thomas, vice-president, research and development, Phillips Petroleum Co.; R. H. Ewing, master car builder, Cities Service Oil Co.

(The report was accepted.)

Specifications for Materials

The committee recommended that changes in the following specifications be submitted to letter ballot:

M-101 (carbon steel axles, non-heat-treated) to discontinue marking this design of axle on the black collar.

M-107 (multiple-wear wrought carbon steel wheels) to modify the specifications.

M-111 (pipe for special purposes) to revise numerous sections of the specifications.

M-115 (boiler and firebox steel) to change the composition.

M-116 (structural steel shapes) to eliminate check analysis for bar-size shapes under ½-in. thickness.

M-125 (machine bolts and nuts) to conform to the new Unified Thread System.

M-126 (carbon steel forgings) to make section 9 conform to commercial practice and to increase the carbon content of Grade F forgings.

M-127 (alloy steel forgings) to make section 9 conform to commercial practice.

M-130 (pipe for ordinary use) to be consistent with commercial practices.

M-201 (steel castings) to modify the carbon content and the hardenability of Grade C steel, and the welding procedure on grades C, D and E castings.

M-501 (lined journal bearings) to change the zinc content.

M-601 (air brake and train signal hose) to permit the use of a 1-in. section cut from the end of the hose for the cold test.

In addition, the specifications for blooms, billets and slabs for forgings (M-105) is being split into two sections, one for carbon and the other for alloy steel billets. Editorial changes were made in M-107, M-403 and M-602.

Emergency specifications were adopted for the following:

M-106 (car and locomotive tires) and M-124 (heat-treated tires) to increase the sulfur and phosphorous limitations for acid steel.

EM-911 (bristle, hair fiber and wire brushes) and EM-915 (nylon filament brushes) to comply with National Production Authority Order M-18.

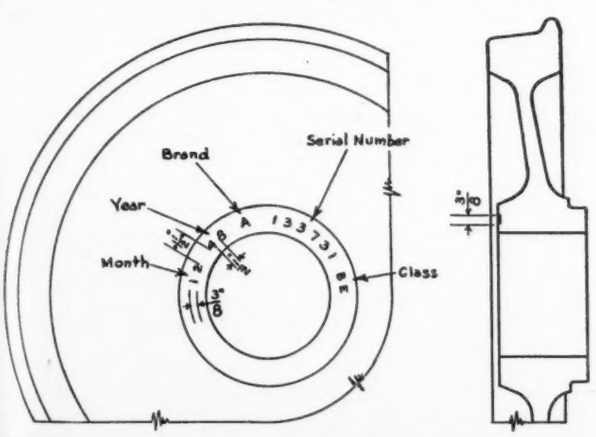
The report described the progress to date in setting up a small research group to work with various A.A.R. committees, diesel locomotive builders and oil companies to investigate diesel fuels and lubricants.

Motion pictures of tests using cut back journal oil as a swabbing oil indicated that some benefit resulted from swabbing the journals at the —15 deg. temperature range. The committee, however, was not in favor of issuing proposed specifications for journal swabbing oil without more evidence, and they further believed that the writing of such a specification should be held in abeyance pending consideration of specifications for new journal box oil.

A joint subcommittee was formed from members of this committee, the lubrication committee, and members of the A.A.R. mechanical engineer's office to outline action to be taken with respect to the hot box situation. Among the items under consideration is a proposed specification to supersede EM-906-60, New Journal Box Oil (all-year grade) and the same requirements to be established in lieu of EM-905-50, Renovated Journal Box Oil.

Members of the committee are: W. F. Collins (chairman), engineer of tests, NYC; P. H. Smith (vice-chairman), engineer of tests, CB&Q; H. G. Burnham, engineer of tests, NP; M. A. Pinney, engineer of tests, PRR; M. C. Haber, research and standards engineer, UP; R. W. Seniff, engineer of tests, B&O; E. B. Fields, engineer of tests, AT&SF; R. McBrian, engineer standards and research, D&RGW; L. S. Crane, engineer of tests, Southern; G. E. Baumgardner, assistant research engineer, N&W; V. C. Barth, chief chemist, C&NW; and P. V. Garin, engineer of tests, SP.

(*The report was accepted and recommendations referred to letter ballot.*)



Notes:
1. CHARACTERS TO BE COLD STAMPED ON FRONT FACE OF HUB AS SHOWN. NUMBER OF CHARACTERS MUST NOT EXCEED 13.
2. BRAND LIMITED TO ONE INITIAL, TO BE AS FOLLOWS:— A-ARMCO, B-BETHLEHEM, C-CARNEGIE (PITTSBURGH PLANT) E-EDGEWATER, G-ILLINOIS (GARY PLANT), S-STANDARD.
3. STAMPINGS TO BE SPACED APPROXIMATELY ½ IN. BETWEEN CHARACTERS AND APPROXIMATELY 1½ IN. BETWEEN GROUPS AND LOCATED APPROXIMATELY CENTRAL OF THE HUB FACE.
4. STEEL STENCILS USED TO PRODUCE CHARACTERS SHALL BE NOT LESS THAN ⅜ IN. IN HEIGHT.
5. SINCE THE LARGE MAJORITY OF WHEELS ARE RIM TREATED, THE LETTER "R" USED IN DESIGNATING SUCH WHEELS SHALL BE ELIMINATED; BUT DESIGNATION "E" MUST BE USED FOR ENTIRE QUENCHED WHEELS.

Alternate marking of deisel locomotive wrought-steel-wheel designs HO33, F-36, A-40, C-42, BX-3B and AX-40.

Safety Appliances

During the year the committee considered a total of 95 applications covering 108 designs for the approval of safety-appliance details for use in the construction, alteration, or conversion of tank cars.

During the year three new designs of metal running boards were investigated, tested and approved by the committee: Irving Subway Grating Company's gratings R-BC and R-TC, and Trousco Type C "Riveton." Following tests of the modification of the Blaw-Knox Electroforged Type SJ-16 running board, it was approved. One other new metal running board design is now under consideration.

Representatives of the Safety Appliance Committee and the Committee on Brakes and Brake Equipment have prepared proposed revisions of a number of rules in the publication entitled "Maintenance of Air Brakes and Air Signal Equipment on Locomotives and Cars," and several conferences have been held with representatives of the Interstate Commerce Commission. Difficulty is being experienced in approving one rule in such form as to satisfy all interests involved.

Variable Load Brake Service

It is the practice of the Safety Appliance Committee to review the detail reports which are prepared from time to time by the Committee on Brakes and Brake Equipment covering periodical inspection and tests of cars in the lot of 398 lightweight hopper cars owned by the Illinois Central which are equipped with ABLC brakes.

The members of the committee are R. G. Henley (chairman), general superintendent motive power, N&W; H. T. Cover, assistant vice-president (oper.) and chief motive power, Pennsylvania; B. M. Brown, general superintendent motive power, SP; F. K. Mitchell, manager equipment, NYC system; J. M. Nicholson, mechanical and research engineer, AT&SF; A. K. Galloway, general superintendent motive power and equipment, B&O.

(*The report was accepted.*)

Labor and Material Prices

The committee has continued the work of analyzing material, labor and new equipment costs in A. A. R. Interchange Rules 101, 107, 11, and 112 of the Freight Car Code, and Rules 21 and 22 of the Passenger Car Code, with a view of determining and recommending necessary changes to be made in the next supplement to the current code.

RULE 101: All miscellaneous material prices in Rule 101 were

rechecked as of March 1, 1952, quotations submitted by the purchasing agents of the ten selected railroads, representing thirty-nine percent of total freight car ownership, showing a mixed trend in material markets as indicated by detail recommendations for revisions shown under this rule.

Note following Item 101-B eliminated to permit application of Wabcoseal fittings to cars under all conditions.

Item 105-A modified to provide price for malleable iron, A.A.R.-1947 Standard, 6½" x 12" journal box lid.

Item 105-C modified to provide price for composite malleable iron and pressed steel, A.A.R. 1947 Standard, 6½" x 12" journal box lid.

Item 145 modified to indicate that charge is intended to cover steel doors for box and automobile cars and not to refrigerator or stock cars.

Fourth note following Item 169-I modified to limit charge where all packing retainer devices are R. & R. or R.

Based on results of a joint study made by a special subcommittee composed of members of the committee on prices for labor and materials and the committee on couplers and draft gears, present note preceding table of draft gear prices in Rule 101 modified to provide average credits for approved and non-approved types of friction draft gears on the basis of separate arbitrary allowances for each class, regardless of the extent of the defective condition of gears removed.

As recommended by the committee on couplers and draft gears, the following modifications made in Sections I and II of the Friction Draft Gears:

Item 250-C modified to show Hulson 202 Modified and 202-A (both conditionally approved) in place of Hulson 202 which has been transferred to Section II as new Item 252-B.

Items 250-E1 and 250-J modified by elimination of words "conditionally approved." (Miner A-22-XL and Waugh-Gould 420, respectively.)

Note 3 modified by elimination of words "conditionally approved." (Waughmat Twin Cushion WM-4-6.)

New Note 5 added to provide for National Rubber Cushion Type MF-260 draft gears.

Items 251-D, 253-G and 253-J modified to include additional types of non-approved draft gears. (Cardwell L-11-S, Miner A-69-XD and A-100-X, respectively.)

RULE 111: Item 10 modified to indicate charge also applies to release control retainer cleaned and tested. Item 28 modified to show piece numbers of the service and emergency portion gaskets.

RULE 112: Recommendations were made in this rule respecting reproduction pound prices of new freight cars of all classes, in order that Supplement of August 1, 1952, may reflect 1951 costs in lieu of figures shown in the present Code. Recommendation was also made in this rule to incorporate new per pound prices in Paragraph 8 of Section B for Classes 103-W, 103-AW and 203-W, noninsulated and Classes 103-W, 103-AW and 104-W insulated tank cars. The new prices recommended for all classes of cars are based on 63,322 freight cars constructed during the year 1951.

Time studies are to be made by a Special Subcommittee covering periodic attention to D-22 type air brake equipment. When time studies are completed, and if results justify modification of existing allowances or the addition of new items, such changes or additions will be made.

On page 4 of he report of the committee on prices for labor and materials for 1951, it was stated that in view of the possibility under present labor contract arrangements of there being four changes in the price rules each year account fluctuation in cost of living allowances, plus the regular scheduled issuance of Supplements, it was felt that the Arbitration Committee should review this matter from a policy viewpoint and determine what should be done to cope with this subject with the least amount of confusion.

Upon instructions from the arbitration committee, the committee on prices for labor and materials added 25 items to the former list of 13 key items, at meeting held on October 25 and 26, thereby making a total of 38 major items, including either labor or a combination of labor and material, to be changed the first of the month following, whenever there is a net increase or decrease of at least $0.05 per hour in the A.A.R. freight car labor rate due to the escalator clause or general increase or decrease in wages paid to men engaged in car repairs.

The arbitration committee also decided that no printed Supplements other than the regular Aug. 1 Supplement to the Interchange Rules will be issued hereafter to cover all combination items in the Price Rules and that all combination items other than the 38 major items mentioned above will be changed only in the regular Aug. 1 Supplement or in the regular annual revision of the Code, the same dates on which material prices are changed.

It is the intent of the committee to investigate labor and material costs again in October and if sufficient change develops, necessary revisions will be made and inserted in the Rules, effective January 1, 1953.

The members of this committee are: T. J. Boring (chairman), general foreman, M. C. B. Clearing House, PRR; P. F. Spangler (vice-chairman), superintendent car department, StL-SF; C. A. Taylor, assistant to superintendent car department, CRI&P; L. B. George, assistant chief motive power and rolling stock, CPR; G. A. Mundt, supervisor of A.A.R. Billing Bureau, NYC; R. M. Smith, vice-president, Union Tank Car Company; A. W. Hinricks, assistant to vice-president, North American Car Corporation; and L. R. Schierbecker, assistant superintendent car department, IC.

(*The report was accepted.*)

Report on Hot Box Alarms

During the past year no meetings of the Committee were held. All road tests of hot box alarm systems or devices which have been approved by the Committee for service demonstration have been completed and were published in the Committee report last year. During the past year there have been no devices submitted for test.

Mention was made in the 1951 Annual Report of a device for detecting overheated journals by employment of a bolometer, or electronic radiation type of detector. The inventor of the device was requested to submit a working model for test but no further communication has been received from the inventor.

Service Experience

Twin Plex Alarm (*Solid and Roller Bearings*).—A summary report covering the experience of the New York Central System during the period March 1, 1951, to March 1, 1952, with the Twin Plex Alarm and is as follows:

The report shows that detections of overheated bearings were made by this device on steam and diesel locomotives and passenger equipment cars. Of the 64 cases included in this report the largest number, 54, were indicated by odor with 7 being indicated by smoke and 3 being indicated by both smoke and odor. In most of the cases reported, detection of the functioning of this alarm was made by the train and engine employees on the train involved; however, others were detected by towermen, station employees, section men, yardmen and crew members of passing trains.

Fenwal "Journ-A-Larm" System (*Roller Bearings*): Reference to the applications of the Fenwal "Journ-A-Larm" system to a group of new passenger cars built for the Southern Pacific Company was covered in the 1949, 1950 and 1951 Annual Reports; the following information was made available by L. H. Sultan, a member of the Committee:

"This device was continued in operation during the past year and performed satisfactorily. False indications were obtained from time to time for various reasons. The majority of false alarms were caused by:

a. Defective control switches on the alarm control.
b. Defective operation of timers operating the solenoid alarm valves.
c. Internal breaking of leads inside the head of the Thermo-switch.

There were no cases of hot roller bearing journals on Southern Pacific passenger cars during the period from April 1, 1951, to April 1, 1952.

The manufacturer continued a development program for the purpose of providing a basically new system for detection of overheated roller bearing journals. The changes are principally in the alarm panel located in the car electric locker and the

thermoswitches. The car journal alarm wiring remains practically unchanged. The circuit arrangement for the new system is a normally open circuit with an automatic checking feature. Several car sets of the improved equipment were received from the manufacturer in May, 1952, and will be applied to cars in the near future. By the end of this year, it is expected that approximately ten cars will be so equipped and results of service tests should be available for the next annual report."

(The report included a detailed tabulation of reports of hot bearings detected on the New York Central—Editor.)

Discussion

The general trend of the discussion of hot box alarms centered around the matter of false indications which seem to be the result of open circuits due to failures in the wiring on the car trucks or in the Thermoswitch. Continued study is being given to the troublesome characteristics of some of the existing types of hot journal alarms with a view to remedying them. One speaker described a new design of hot box alarm which embraces improvements that eliminate some of the faults of existing designs and while it has been in service only a short time it gives indication of the possibility of making a substantial reduction in the number of false indications.

The report was prepared by a committee of which W. M. Keller, director of mechanical research, A.A.R. Mechanical Division, was chairman.

(The report was accepted.)

Loading Rules

The modernization of the Open Top Loading Rules at the request of shippers was completed with the publication of Pamphlet MD-6. This sectionalizing of the rules, requiring a review of all loading figures and the preparation of six individual pamphlets, now supersedes the Loading Rules Book issued June 15, 1947 and Supplement No. 2 thereto, and the Special Supplement covering Grading and Road Making Machinery issued on Feb. 1, 1950. The present open Top Loading Rules are now contained in the following publications:

MD-1—Steel Products, issued Sep. 1, 1950.

MD-2—Machinery, issued Feb. 1, 1951.

MD-3—Forest Products, issued June 1, 1951.

MD-4—Pipe, issued June 15, 1951.

MD-5—Miscellaneous Commodities, issued July 1, 1951.

MD-6—Road Grading, Road Making and Farm Equipment Machinery, issued Mar. 1, 1952.

Special Supplement No. 1—Department of Defense Material, issued Oct. 1, 1950.

Special Supplement No. 2—Department of Defense Material, issued Jan., 1951.

Several joint meetings were held with the Farm Equipment Institute, at which time twenty new loading figures covering combines, corn pickers, hay balers, etc., were agreed on and specifications and drawings formulated and included in the preparation of Pamphlet MD-6. The balance of the figures in the Loading Rules Book, covering tractors and farm equipment machinery, were also reviewed and revised, and together with the new figures above, comprise Part 2 of the pamphlet, with Part 1 made up of the grading and road making machinery loading figures. The agreed-on revision in the tractor figures has greatly reduced the number of cars shopped for adjustment of lading, there being no cases reported of tractors falling off enroute or of having caused a serious accident.

The educational program set up last year by the Department of Defense in conjunction with the A.A.R. is being continued. The material presented at these seminars, including the visual aids, has now been prepared and is being used by the Department of Defense for the purpose of instructions in proper loading methods at all military depots or installations.

The possible revision of Special Supplements 1 and 2 has been brought to the committee's attention at a recent joint meeting with the Department of Defense. It was pointed out loading methods should be formulated and included in these rules for other items of material or machines which are shipped in volume, and not at present covered by specific loading figures. Several joint meetings have been held during the past year to progress the preparation of new loading methods and to consider recommendations for changes or revisions in the present loading figures. Specifications and drawings for six new loading methods covering cranes, semi-trailers, etc., have been formulated and the necessity of including loading figures for other essential items is being studied jointly with the Department of Defense. A number of inspections and shock tests have been held on proposed methods of loading trucks, trailers, jet engine containers, artillery units and tanks.

One joint meeting was held with the American Iron and Steel Institute, at which time recommended changes in the pipe loading figures and specifications were approved for inclusion in the Steel Pamphlet, MD-1. Three new loading figures, covering alternate methods of loading wire mesh, were formulated following inspection and shock tests of specimen loads and on conclusion of successful experimental test shipments. Other inspections have been held resulting in the preparation of new figures to cover the loading of cranes, clay pouring channels, and clay sewer pipe; these will be included in the next revision or printing of Pamphlet MD-5.

The report was divided into two sections, one covering all completed items scheduled for inclusion in the rules, the second covering subjects still under consideration.

The first group of items concerned revisions to section (A), rules 8 and 15, table 32, and Figs. 22, 71-A, 74-A and 77-A of MD-1; note 2—skids, section (a) of MD-2; rules 8 and 15, and Figs. 5-12, 14, 18-25, and 28-34 of MD-4; rules 8, 15 and 19-B, table 32, and Figs. 8A, 11, 22-31, 33-35, 68, 77 and 78 of MD-5; and rule 15 of MD-6.

The second group, contained 21 subjects still under consideration, some of which require only revisions in the present specifications and figures, while others require the formulation of new specifications and figures to cover. The subjects comprise ten on steel products (coils; plates; sheets; slabs; roofing or siding panels; tanks; pipe), one on farm machinery (hay balers), two on miscellaneous commodities (plate glass; boxed auto parts), and eight on Department of Defense Materiel (tanks; guns; trailers; engine containers; trucks).

The Department of Defense Subcommittee is considering the revision of all tank loading figures to show weight limits in lieu of the present wording, and revision of other methods covering items such as guns, trailers, trucks, etc.

Progress has been reported by the subcommittees on the loading methods under consideration with eleven inspections having been made at the shippers' plants. Several of these inspections have resulted in authorizing experimental shipments, which are still being carried out and the balance are in various stages of completion and inclusion in the published rules.

The members of the Loading Rules Committee are: W. B. Moir (chairman), chief car inspector, PRR; H. H. Golden (vice-president), supervisor A.A.R. interchange & accounting, L&N; T. W. Carr, assistant to superintendent of equipment, P&LE; G. D. Minter, district car inspector, N&W; A. H. Keys, superintendent car department, B&O; H. S. Keppelman, superintendent car department, Reading; L. F. Delventhal, Jr., transportation inspector, WP; H. J. Oliver, assistant superintendent motive power, DT&I; F. A. Shoulty, assistant superintendent car department, CMStP&P; H. L. Hewing, superintendent interchange, Chicago Car Interchange Bureau; N. A. Williams, general car inspector, UP; H. G. Neale, assistant chief draftsman, CNR; and J. H. Campbell, supervisor of loading, Mechanical Division, A.A.R.

Discussion

The discussion stressed the importance of proper loading from the standpoint of the shipper as well as of the railroads. The tendency of the shipper to economize on labor and material in securing loads may cause serious hazards and delay deliveries. When the shipper is made to realize this he is less critical of the railroad.

(The report was accepted.)

Forest Products Loading

A canvass of roads made by the committee showed that there was a notable increase during the latter part of 1951 in the num-

ber of shipments on which the lading shifted to the extent that it caused trouble. A review of the reports received indicated that a large number loads were shifting due to the shippers loading long material on top of short material. Further, the loss of surfaced material from open top cars was partly caused by some shippers placing short pieces in the center of tiers. These short pieces invariably work out of the core of the tier and work their way off sidewise and endwise, frequently causing damage to signal and switch equipment. Another contributing factor was the fact that in various parts of the country the shippers were not complying with the rules, using insufficient stakes, undersize stakes, insufficient ties, improper separators, incomplete top layers not properly secured, loose loading, and improper segregation as to lengths.

The railroads were to a great extent responsible for the poor loading as such loads should be rejected when offered for shipment. It has been the experience of the committee that in nearly every case the shippers are as much interested in safe and expedient movement of their products as the railroads and welcome any information from the carriers pertaining to delays to their shipments due to their failure to properly load and secure the lumber before offering the cars for shipment.

The committee prepared proposed modifications of the present requirements of Figures 6, 7 and 9, of Pamphlet MD-3, which cover the loading of lumber on single cars. These proposals were submitted to the shippers for review and comments, prior to a joint meeting with the representatives of the various lumber associations, at Portland, Ore. The recommendations were reviewed in detail and an agreement reached on all points at issue. Revised specifications containing all agreed-on changes, additions or deletions were a part of the report.

Included in the revised specifications were provisions for an alternate design of center blocking between side by side piles to reduce the amount of material now being used for this purpose. Revised drawings for all three of the loading figures, namely 6, 7 and 9, will be issued to all concerned in the near future.

The possible revision of Figures 16 to 27 of Pamphlet MD-3 has been progressed to the point where they will shortly be forwarded to all of the various Associations of Pole Shippers for review and comments, with the request that a Joint Meeting be held in September of this year for the purpose of reaching an agreement on all revisions necessary, after which revised specifications and drawings will be issued to all concerned.

The proposed revision of the figures involved is a change from the present specifications, in that letter symbols for similar items in each figure will be the same, for example, A for brake wheel clearance, B for side stakes, etc.

The loading of unpeeled pulpwood, crosswise and full width of car, is not at the present time covered in the rules although it is a troublesome load. The committee is requesting all member railroads to submit an adjustment report covering each load of unpeeled pulpwood shopped for adjustment during the period from June 1 to Aug. 31, 1952. When these reports are received they will be reviewed and tabulated, and if sufficient information is available to warrant it, a joint meeting will be held with the pulpwood shippers, in an effort to convince them that side protection is necessary on unpeeled as well as peeled pulpwood.

The members of this committee, in addition to the personnel of the Loading Rules Committee, are: F. G. Moody (chairman), superintendent car department, NP; J. E. Rose, general inspector, A.A.R. Interchange Regulations, CPR; G. J. Lehnerer, superintendent car department, IC; J. F. Likarish, master car builder, GN; and C. C. Leriche, supervisor car construction, SP. F. A. Shoulty, assistant superintendent car department, Milwaukee Road, is chairman.

Discussion

The discussion stressed the importance of the railroads working closely with lumber shippers so they will understand the need for living up to the rules. One difficulty in the way of getting tight loads is the variation in the width of open-top cars, varying all the way from 7 ft. 6 in. to 10 ft. A representative of the California Public Utilities Commission told how the railroads, lumber shippers and that commission work together to bring about safer loading of forest products. He stressed the necessity of load inspectors educating the men who assemble the lumber in units before they reach the car. These men, he said, though usually the last men hired, determine whether cars will be properly loaded.

(*The report was accepted.*)

The opening session of the twenty-sixth annual meeting of the Mechanical Division in the Terrace Room of the Fairmont Hotel, San Francisco, on June 24

Throttle Control of Tractive Force

How this means of limiting motor current works and what it means in diesel-electric locomotive operation

"Throttle control of tractive force" is the name coined to describe the control system currently used on Alco-G.E. diesel-electric road locomotives

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THE first step in developing the control system currently used on Alco-G.E. diesel-electric road locomotives was to determine the features desired in a modern control scheme. Prominent among the items listed was some means for rapid, positive control of tractive force in steps suitable for good starting and handling trains, even under adverse conditions. The control system now in use, was designed to include such a method and the name "throttle control of tractive force" coined to describe it.

Limitations of Standard Control

Standard practice by most builders over a number of years has established the use of eight throttle handle notches on diesel-electric road locomotives. A governor maintains a predetermined diesel engine speed for each throttle position. On Alco-G.E. locomotives, this speed ranges from a minimum of 350 r.p.m. in the first notch, to a maximum of 1,000 r.p.m. in the eighth notch.

The maximum power output in each throttle position is controlled and held constant by a load-control feature incorporated in the engine governor. This control regulates the load demand of the main generator on the diesel engine. The limit is set at the horsepower, that the engine

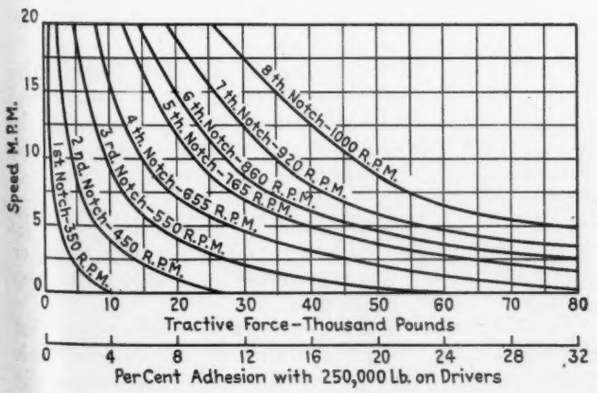


Fig. 1—Hypothetical speed-tractive-force curves of a 1,600-hp. freight locomotive with 65-m.p.h. gearing, not equipped with throttle control of tractive force

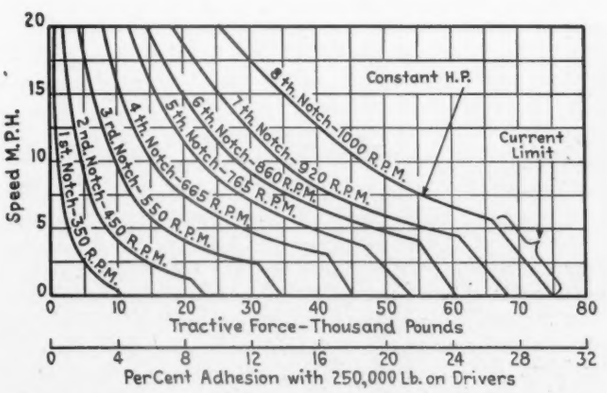


Fig. 2—Speed-tractive-force curves of same locomotive as Fig. 1, equipped with throttle control of tractive force, showing effect of current limit

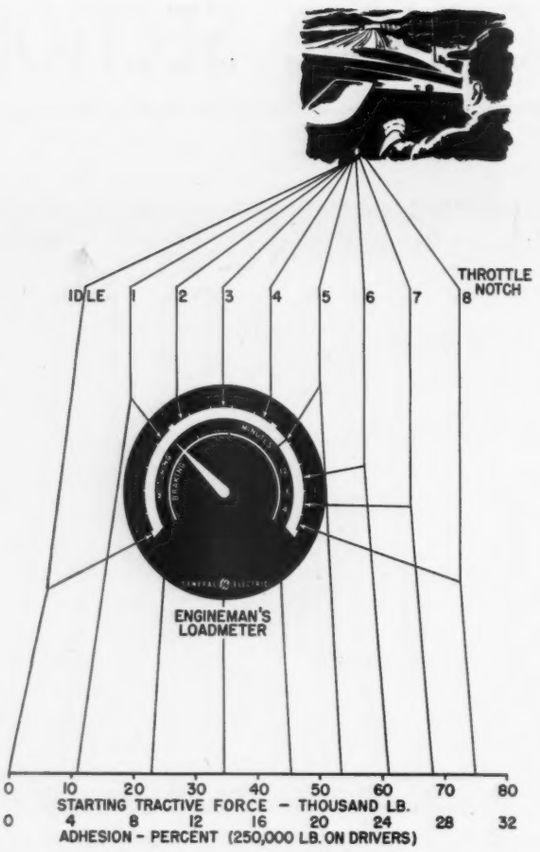


Fig. 3—Relationship between throttle notch, motor current and tractive effort for the locomotive of Fig. 2

can produce at that speed, without appreciable drop in speed. Fig. 1 gives hypothetical constant-horsepower speed-tractive-force curves for the eight throttle notches of a 1,600-hp. road locomotive with 65-m.p.h. gearing. These are plotted up to a speed of 20 m.p.h. From the figure, it can be seen that the tractive force increments, when starting a train, would normally be very large while the throttle is being notched up. This indicates the need for another form of control to limit the increments to suitable values and permit using all the throttle notches, if necessary, to start the train.

In the majority of cases, it is possible to start a train with the conventional control. However, this does not lend itself well to smooth train handling, nor does it provide any protection against excessive overload current on the traction motors and generators. The tractive force control feature was incorporated on the Alco-G.E. road locomotives to overcome these weaknesses.

Principles of the New Scheme

To control the tractive force of a locomotive, it is only necessary to regulate the motor current. This is true because motor current is an invariable measure of tractive force. The Alco-G.E. control system employs saturable core reactors to measure the current flowing to the traction motors. This current is then controlled by limiting the generator output to a definite value for each throttle position. The effect of this current limit on each throttle notch curve is shown in Fig. 2. It causes the tractive force to follow the straight line starting at 0 m.p.h. and ending at the point where the selected horsepower is being delivered for that particular throttle position. As a result, the starting tractive force of the locomotive is divided into eight convenient steps corresponding to the eight throttle notches. This compares with approximately four steps available when the current limit feature is not used. Furthermore, using this scheme, the predetermined starting tractive force is available immediately after the engineman advances the throttle to a new position.

Fig. 3 gives a visual concept of the relationship between starting tractive force, load meter current and throttle position. It is based on a typical 1,600-hp. road locomotive with current limit control.

Simplicity of Handling

A locomotive equipped with this control requires slightly different throttle handling than one not so equipped. In order to derive maximum benefit from this system, the engineman must understand its proper use. He must realize that he has to advance the throttle all the way to the eighth notch in order to develop full tractive force. Since the maximum current is controlled, this can be done without electrical or mechanical damage to the equipment. The ability to thus open the throttle wide at start is highly desirable. In fact, it is necessary under certain conditions. To permit heavy current to pass through a stalled traction motor for any appreciable length of time is the worst treatment it can receive. Moreover, operation of the diesel engine at the higher throttle notches with light load for any appreciable time is undesirable. Therefore, the locomotive should be started as quickly as possible and accelerated to a speed that will bring the load meter into the continuous rated zone in the minimum time. Throttle control of tractive force enables the engineman to do both of these things.

Operating Advantages

This control feature has proved to be a valuable tool for improved train handling. The engineman has a fast, positive control of tractive force that is there when he calls for it. The fact that all eight throttle notches may be used in starting gives smaller tractive force increments. As a result, many trains may be started without taking slack and running the risk of pulling drawbars. Also trains may be started on adverse grades which might otherwise require doubling the hill. This was demonstrated during a recent test of a 4-unit, 6,400-hp. road freight locomotive. The locomotive was stopped on a 2.4 per cent grade with a rated load for that grade of 2,399 actual tons. By taking slack, and through proper application of tractive force, the train was started easily with the throttle in the sixth notch and an approximate load meter reading of 1,200 amp. (12 minutes on the time scale).

Another important advantage of this controlled tractive force feature is protection of the traction motors and generators from excessive current. The system limits the current to a safe value in all throttle positions when starting a train. The engineman need not fear damaging the electric equipment unless he exceeds the short-time capacity of the traction motors by operating in the limited zone of the load meter for too long a time, or unless he permits heavy currents to continue to pass through the motors at standstill.

Throttle control of tractive force is a refinement that still further increases the ability of the diesel-electric locomotive to get tonnage over the road. This is especially significant just now, when increasing traffic and curtailed production of new motive power require working every locomotive at maximum efficiency.

Locomotive No. 52 on the 1.14 per cent grade between Ogden, Utah and Wahsatch, Utah

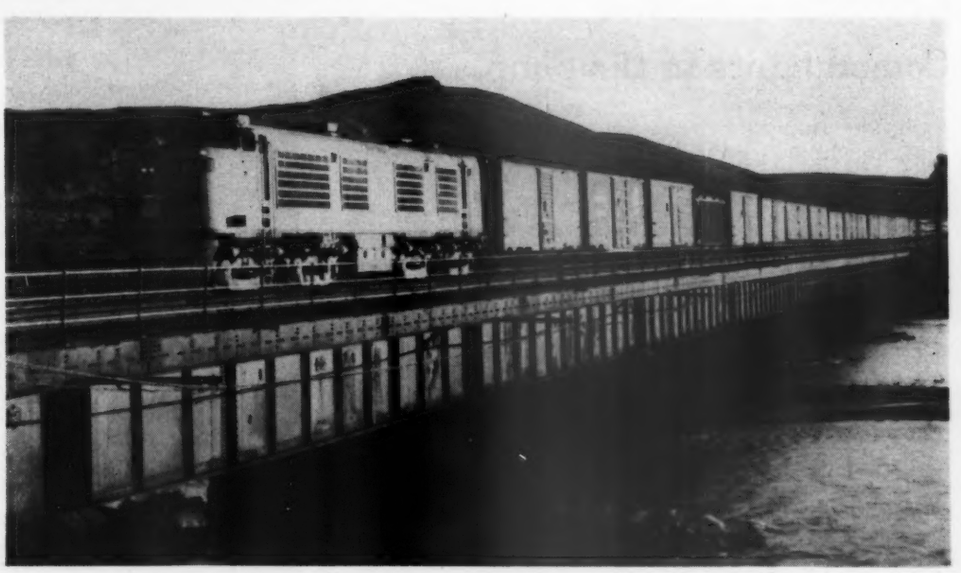
Union Pacific's Gas Turbines Now in Regular Service

Gas turbine-electric locomotives are now operating on the Union Pacific between Green River, Wyoming, and Ogden, Utah, a distance of 175 miles. Locomotives Nos. 51, 52 and 53 are in regular pool service.

Westbound, with a ruling grade of .82 per cent, a locomotive hauls trains of 5,000 tons. Eastbound, with a helper, from Ogden, Utah to Wahsatch, Utah, with a ruling grade of 1.14 per cent, the tonnage is 4,800 to 5,000. Eastbound, without a helper, the locomotives will handle 3,800 tons. The weight of each locomotive is about 554,000 lb., and they are conservatively rated at 4,870 hp.

The average time for the round trip, including yard movements, servicing and inspection, is 16 hours. Nor-

Above: Locomotive No. 51 on the service tracks at Green River, Wyoming



Right: A gas-turbine-electric locomotive brings a train over the Green River, Wyoming

mally each locomotive makes three round trips every two days. The locomotives use Bunker "C" type fuel which has been processed to remove harmful elements.

There have been only two locomotive failures attributable to locomotive equipment since the first unit, No. 51, went into service January 31, 1952. The second unit, No. 52, was placed in service April 9, 1952. The third unit, No. 53, was placed in service May 7, 1952, and the fourth unit on June 4, 1952.

The locomotives are operated by regular engine crews without special supervision. The photographs were taken May 3, 1952.

Grinding Generator Commutators in the Shop

A jig for turning the commutators of diesel locomotive generators in the shop is being used in the Marion, Ohio, shops of the Erie. For this purpose, the commutator bearing is in its normal place in the end bell and a special jig, mounted on the generator bed plate as shown in Fig. 1, supports a bearing which takes the place of the bolted engine connection.

One brush holder is removed, and a commutator grinder mounted on the brush stud as shown in Fig. 2. This is a ball bearing type of grinder recently developed by the Martindale Electric Company. It employs a fixed stone and grinding is done with a fine stone only.

For grinding, the generator armature is rotated slowly by current from a welding generator, while an operator, as shown in Fig. 3, moves the stone back and forth across the face of the commutator. Undercutting is done only when necessary and beveling of commutator bars is not necessary.

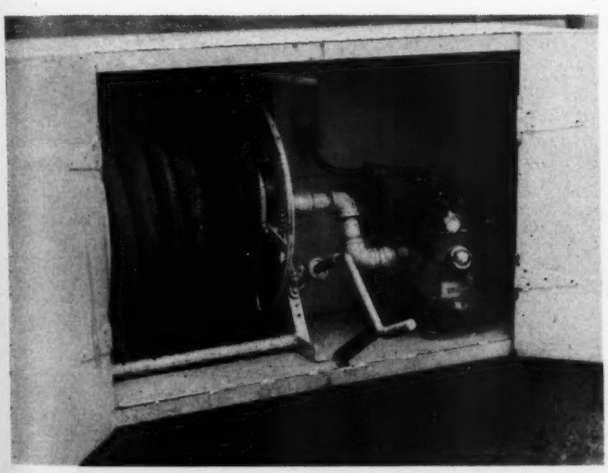
Fig. 1 (left)—A jig mounted on the generator base supports a bearing which takes the place of the bolted engine connection

Fig. 2 (above)—The ball-bearing grinder is mounted on a brush stud

Fig. 3 (below)—Current from a welding generator turns the armature slowly while the operator moves the stone across the commutator

Fig. 1—Diesel's "little helper"

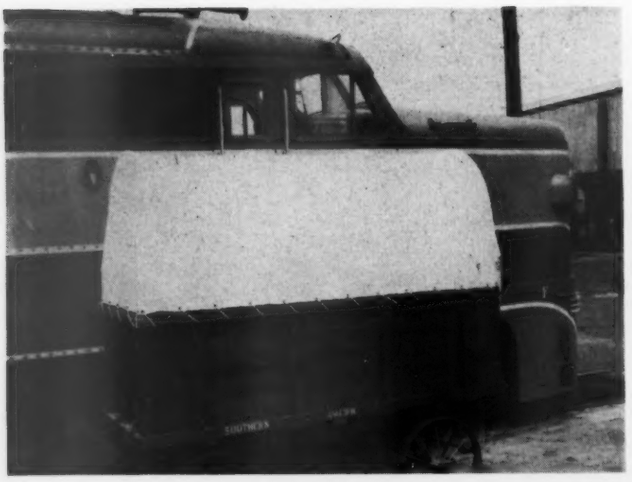
Texas & New Orleans Devices For Servicing Diesels

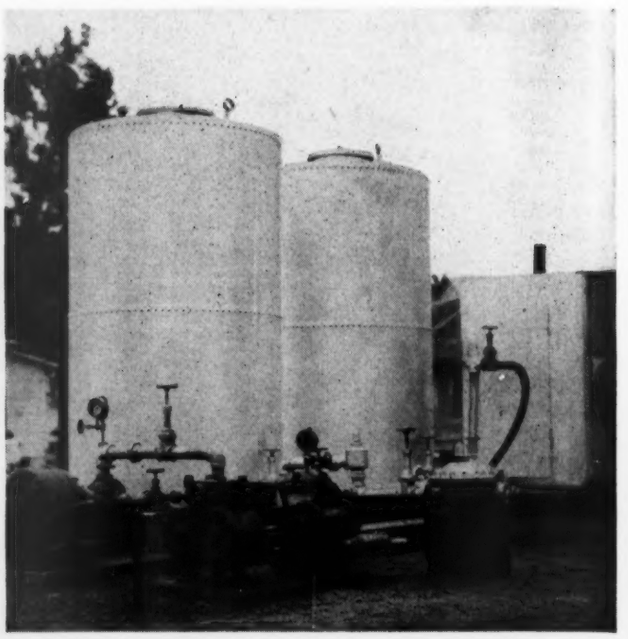


Above: Fig. 2—Fuel pump and hose. Lower left: Fig. 3—Fire extinguishers and journal oil. Lower right: Fig. 4—Miscellaneous supplies

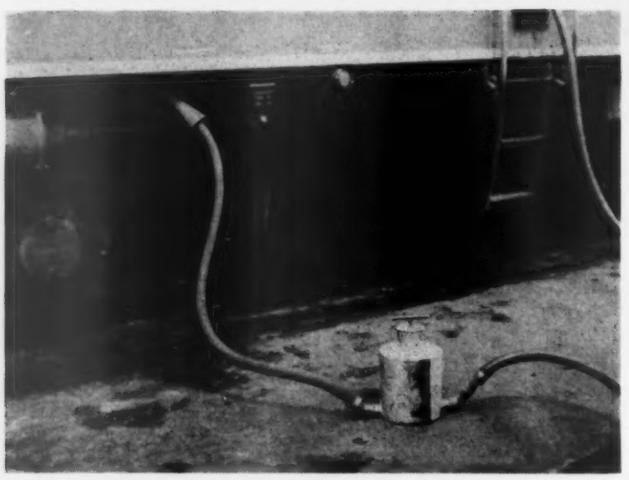
When diesel oil storage and pumping facilities are installed in a permanent manner for a single locomotive at a remote location, the cost per locomotive is proportionally high. Figure 1 shows the T. & N. O.-Southern Pacific version of a diesel's "little helper". This truck delivers fuel oil, crank case oil, sand, and other supplies to diesel switchers in five outlying centers of diesel activity in the Houston area.

An International KB10 chassis is provided with tank containers for 1,250 gal. of fuel oil, 50 gal. crank case oil, and 1,100 lb. sand. Cabinets contain the miscellaneous supplies. A cabinet at the side is equipped with a pump for delivering fuel oil. It is a Cranco rated at 100 gal. per min. and 125 lb. per sq. in. maximum. The drive is from a power take-off from the truck transmission. Forty-five feet of 1½-in. hose is connected. Figure 2 shows the hose coiled on the hose reel, and also the crank used to recoil the hose.





Above: Fig. 5—Filter cart. Below: Fig. 6—Inhibitor tank. At right: Fig. 7—Crankcase oil facilities



A cabinet on the other side has a spout can with journal oil. Two fire extinguishers are also kept in this cabinet, handy in case of fire. This cabinet is shown in Fig. 3.

The cabinet at the rear is shown in Fig. 4. This contains the miscellaneous supplies, including the fuses, flags, torpedoes, water cups and lanterns. These are issued to the locomotive as needed. An oil can and tool box are carried for the mechanic who takes care of minor maintenance work.

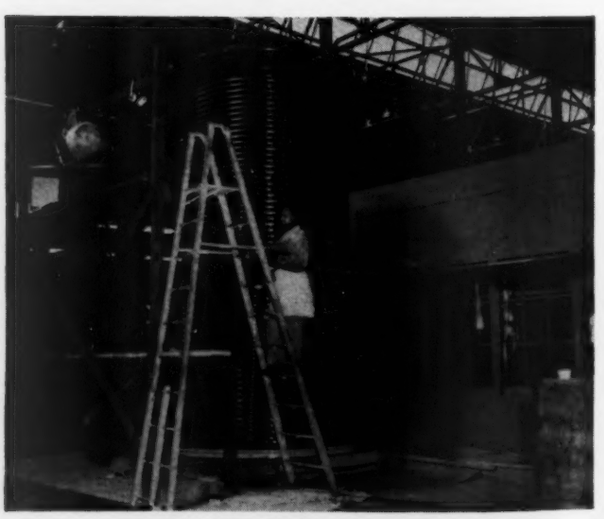
Filter Transporting Cart

Car body and turbo-charger filters at Houston are now cleaned at a contract shop. When they are returned, they are placed in a covered cart. This helps keep them clean, and protects them from damage. This device is shown in Fig. 5.

Applicator for Inhibitor

In order to make easy what was otherwise a troublesome job, the shop forces devised an arrangement which helped get the chemical inhibitor mixed with the water and into the engine cooling water system. Figure 6 shows the small tank built of plate sufficiently heavy to withstand full water pressure. A screwed top enables the chemical to be poured in and then made pressure tight. Water enters through the hose at the right and all chemical has been dissolved before the water compartment is full.

Another arrangement produced by shop forces helps in the handling of crank case oil. Figure 7 shows the assembled apparatus. It enables oil to be drawn from drums and pumped into storage tanks. Dual pumps are provided, one electric and one steam. Oil may be drawn from either or both tanks and discharged through the meter to a hose of sufficient length to reach the locomotive on nearby tracks. In the case of Alco passenger locomotives this is delivered direct into the lube oil cooler. By this means, the lube oil system is pre-charged before starting the engine.



Manufacturing process showing continuous reel of high power cable being made in the Habirshaw division of the Phelps Dodge Copper Products Corp., Yonkers, N Y. This cable, which is designed to carry up to 138,000 volts, will stretch 1 1/3 miles under water to bring 27,000 volts of electric current from the Consolidated Edison, New York, to power stations in Staten Island

DIESEL-ELECTRICS—How to Keep 'Em Rolling

12 Contactors and Relays

In the "horse and buggy days," it took a husky driver to control two horsepower. Today, the engineer on a locomotive can control 6,000 hp. with almost no effort. He does this by using remotely controlled switches, called contactors and relays. These are automatically operated from his seat by means of control handles.

We know that an electric circuit must be completed before current can flow. Also, if we want to stop the current we must open the circuit. On locomotives, contactors and relays do much of this work. Contactors are generally used for power circuits where the current goes above 10 amp. They are usually large and sturdy. Relays do the same job in low-current circuits and are much smaller in size.

What Is the Contactor's Job?

Before we examine contactors and relays in detail, let's think about closing and opening a circuit. An example is the plug on the cord of an electric soldering iron. When you want to heat the iron, you "plug it in." This closes the circuit and current flows to the iron. When you're through you "pull the plug." This opens the circuit and stops the flow of current. Now apply this example to the locomotive circuit shown in Fig. 1. Current cannot flow because the circuit is open at point *A*. One way to close it might be (though we don't advise it!), to take hold of the two leads and butt them together. To do this, the leads would have to be flexible and the ends bare. You would have to supply the force to butt them together and hold them as long as you wanted current to flow. When you wanted to stop the current, you would have to pull the leads apart. This would form an arc, and if the current were large, you might have trouble breaking it. You could blow the arc out with an air hose, or pull the wires far enough apart to break it.

This illustration tells us that:

1. To close a circuit, we must have (1) a force to butt the leads together; (2) at least one flexible lead; (3) a bare copper contact surface on the end of each lead.
2. To carry current, we must hold the wires firmly together.
3. To open a circuit, we must have (1) an opening force; (2) a flexible lead; (3) bare contact surfaces; (4) a way to put the arc out.

Now, let's see how a contactor does these things.

This is the twelfth of a series of articles on maintenance of diesel-electric equipment. This article is written by B. L. Judy and P. W. Pelton, both of the Locomotive and Car Equipment Department, General Electric Company, Erie, Pa.

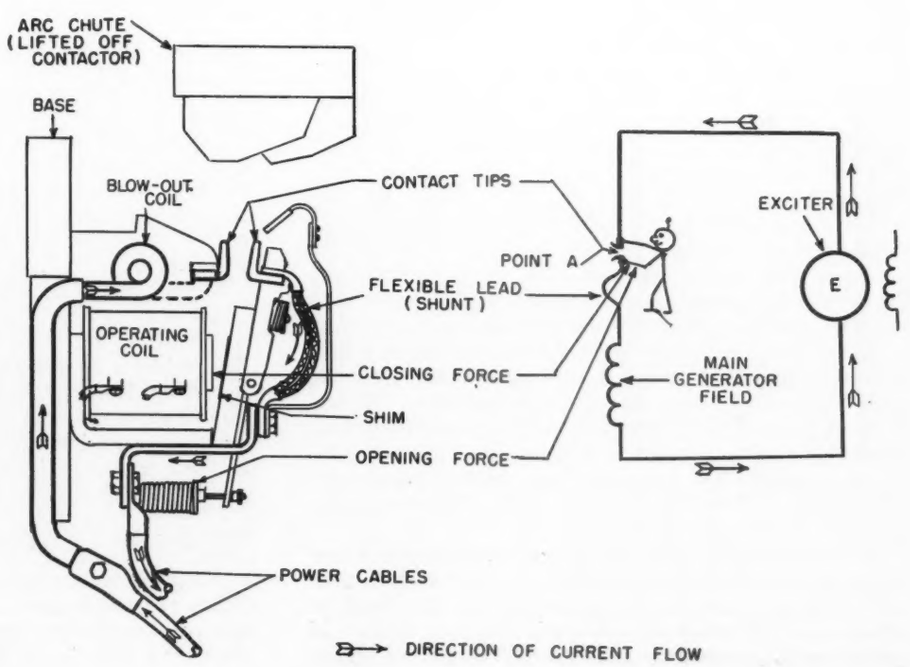
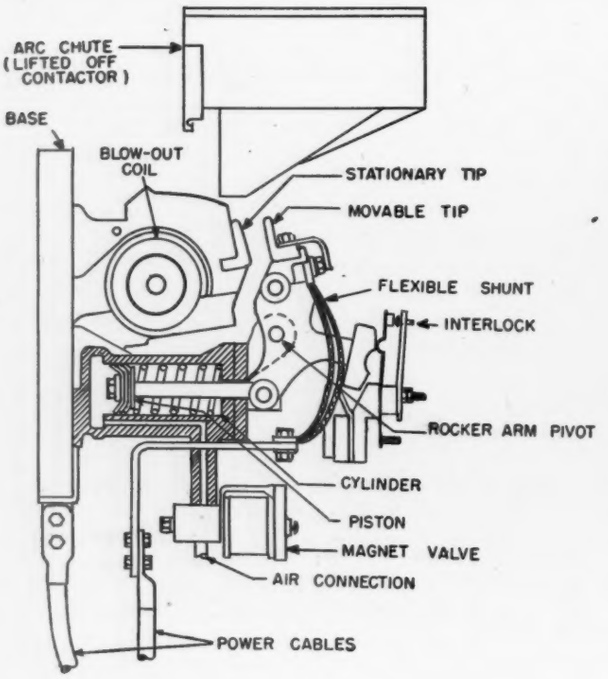


Fig. 1—How we close a circuit with a contactor



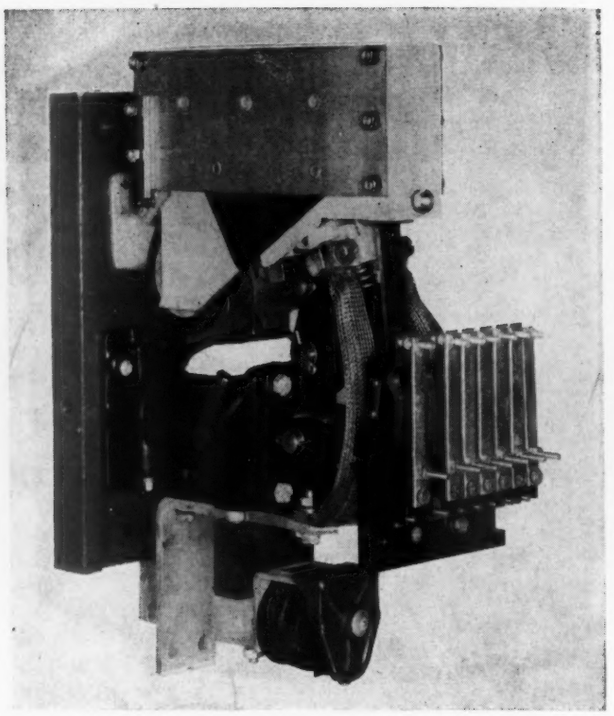


Fig. 2—An air-operated contactor "inside and out"

First, it must supply the closing and opening force. This is usually done in one of two ways.

Air-Operated Contactors

In the main traction circuits that carry heavy currents, contactors operated by air pressure are commonly used. As Fig. 2 shows, such a contactor has a piston, piston rod, spring and cylinder. The piston packing is some flexible material—usually rubber or leather. It is sandwiched between metal washers on the end of the piston rod. The other end of the rod is connected to a lever which moves one of the contact tips, commonly called the movable tip. The cylinder is a casting with the walls honed to a very smooth finish.

All air-operated contactors have some means for lubricating the cylinder. This lubricant does three things. First, it reduces wear and prolongs the life of the piston packing. Second, it lessens the friction between the packing and the cylinder walls, so the piston moves freely. Third, it keeps the packing pliable so it fits the wall closely and forms an air-tight seal. It's important to add lubricant regularly, or the cylinder wall will get sticky. This makes the contactor sluggish. Sluggish contactors are sometimes the cause of road failures. They may also cause main generator flashovers.

The old saying, "the more the better" doesn't hold true for contactor lubrication. If you use too much oil, it will blow out when the contactor operates. Then a film of oil will form on the contactor and everything around it. This oil film is a good dust collector. So, at the best, you will have a messy control compartment. If you want to keep out of trouble, add oil only as recommended by the manufacturer.

On diesel-electric locomotives, there is a supply of low-pressure air called "control air." Among other things, it is used to move the contactor pistons. It should be clean and reasonably dry. Otherwise there is sure to be trouble with gummed-up air devices. Water and sludge settle in the control reservoir and should be drained off by means of the blow-down cock. A gage indicates the control air pressure—usually about 70 lb. If the pressure is below normal, contactor operation will be sluggish. Pressure higher than normal will likely cause no serious trouble. It should, however, be corrected at the first opportunity.

Air entering the cylinder builds up pressure and pushes the piston away from the contactor base. This is the force that closes the contact tips. At the same time, the piston return spring is compressed. When the air supply is cut off, the spring forces the piston back. This is the force that opens the contact tips.

A magnet valve (Fig. 3) is used to control the flow of air to the piston. It is just a two-position air cock remotely controlled by electricity. In one position, it admits air to the cylinder. In the other, it cuts off the air supply and opens an exhaust port to let the air in the cylinder escape. The valve position is determined electrically. When current flows through the operating coil, the valve moves to one position. When the current is cut off, a return spring moves the valve to the other position.

Magnet valves usually require very little maintenance. Many of them have a ground valve seat. If this does not fit properly, the valve will leak. This can usually be detected by a hissing sound. A leaky valve should either be repaired or replaced, for it may cause faulty operation of a contactor. A magnet valve may also have a bent or sticky valve stem or a defective operating coil. Either of these will show up when you try to operate the contactor electrically.

Magnetically-Operated Contactors

Magnetic contactors are operated directly by electricity. When current flows through the operating coil (Fig. 4) the core becomes a magnet and pulls the armature against the core. This is the force that closes the contact tips,

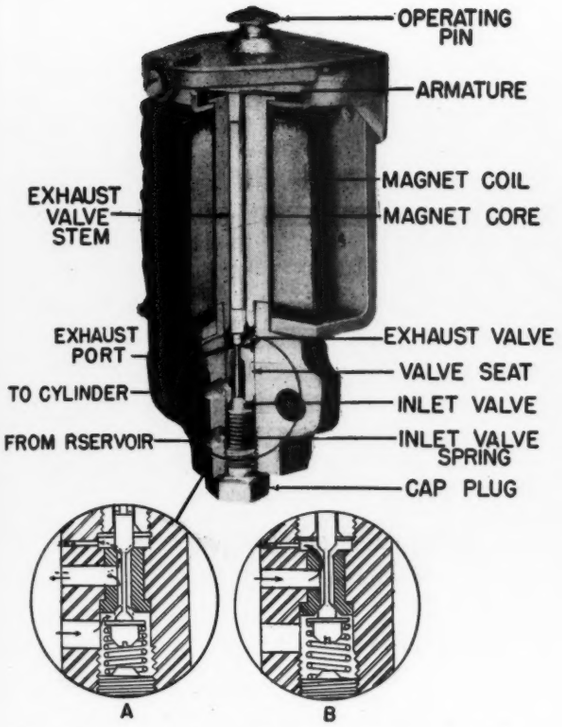


Fig. 3—A typical magnet valve and how it controls air flow: (a) air flowing from control reservoir to cylinder; (b) air flowing from cylinder out of exhaust

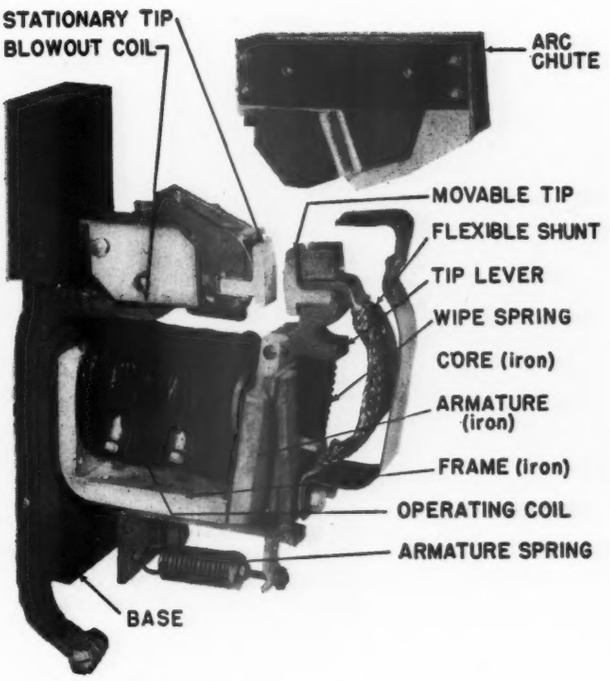


Fig. 4—The principal parts of a magnetic contactor

and completes the circuit. As the armature moves, it also stretches the armature spring. When the current flow to the coil is stopped, the core ceases to be a magnet. The armature spring pulls the armature away from the core and back against the stop. This is the force that opens the contact tips. You can see that the coil, core and armature of the magnetic contactor replace the magnet valve, air piston and cylinder of the air-operated contactor. So there is no worry about air supply or lubrication on a magnetic contactor. But there are a few other points to watch.

The knife edge on the armature may become worn. This can cause faulty operation. Don't try to repair such an armature—replace it. The armature spring is exposed for easy adjustment—so someone may "monkey" with it. If a contactor operates improperly or fails to pick up, refer to your instruction book for adjustment of this spring.

The armature shim is another place to watch. It is brass or other non-magnetic metal, and is used to keep the armature from sticking to the core. If this shim gets worn or lost, the armature will tend to stick and make the contactor sluggish. If you suspect this, a look at the shim will tell if it is the offender.

There are occasional failures of the coils used on magnet valves and magnetic contactors. If the coil has "roasted out," it will have a characteristic burned smell. If it is open-circuited, you may be able to find it with a "bell set." However, some bad coils are difficult to find because they have only partly failed. An inexpensive ohmeter or circuit "analyzer" is essential in spotting them. Coil resistances are usually given on the locomotive wiring diagram. In most cases, coils with resistance readings 10 per cent above or below the value given should be replaced. Grounded coils are rare, and will show up on the regular megger or hi-pot tests.

Shunts Must Be Flexible

When we talked about butting the leads together by hand (Fig. 1), we noted that at least one of them must be flexible. All contactors have such a flexible lead, called a shunt. It is made up of woven strands of very fine copper wire. Normally, it will last for several hundred thousand operations of the contactor. But, since the copper strands are very fine, the shunt can be easily damaged. On larger contactors, this may happen through misdirected arcs. If an arc strikes the shunt, it may weld together a large number of strands. Then this part of the shunt is no longer flexible. The result is usually a broken shunt. While a damaged shunt may last to the next inspection, it is a good idea to replace it as soon as possible.

Loose connections also shorten shunt life. If the bolts that fasten the ends of the shunt to the contactor get loose, there is a poor connection and the shunt terminals will overheat. This makes the copper strands brittle and discolored. Such a shunt will break in a little while. So, when you inspect a contactor, examine the shunt and its connections.

Contact Tips

The exposed surfaces which actually make contact and complete the circuit (Fig. 5) are called contact tips. They get mechanical wear and electrical burning. They are usually made of copper and bolted in place. If these bolts get loose, the tips will overheat. Your troubles won't stop here. The heat will carry out to surrounding parts and cause warping and binding. This makes it tough to get them off. So it pays to keep the tip bolts tight.

Tips are the "half soles" of the contactor. Any tip worn half to three-fourths through should be replaced. Sometimes the wrong tips have been put on a contactor. This is a bit like exchanging shoes with your wife. Use the right tips, and when you mount them, be sure the contact surfaces line up (Fig. 6). Cocked tips hit first

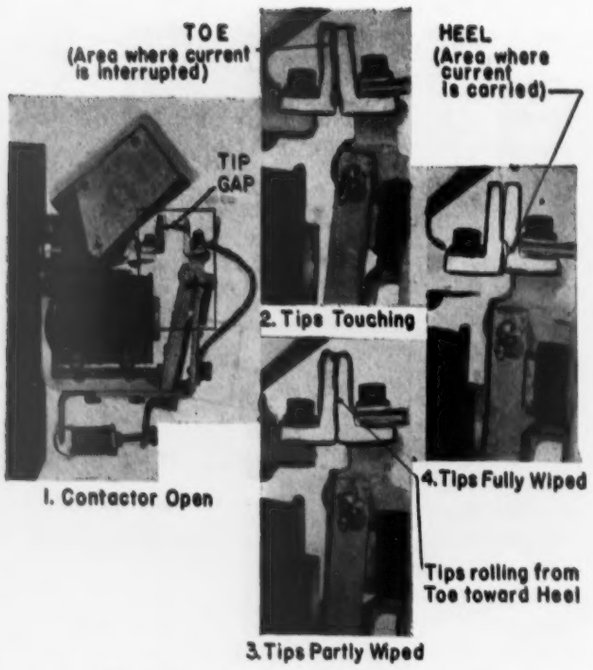


Fig. 5—Important points about contactor tips

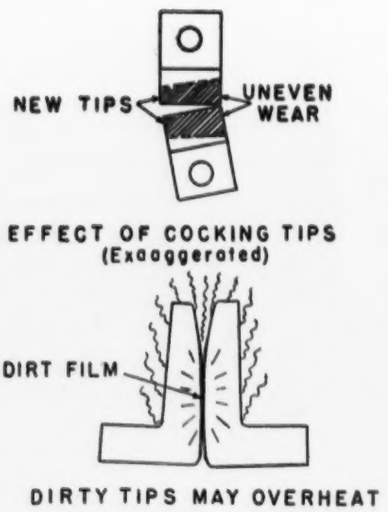


Fig. 6—Two reasons for trouble with contact tips

on one edge and wear away rapidly. The best way to prevent this, is to line up the tips before tightening the bolts. Then hold the tips in position with a wrench while you set up the bolts.

Contact tips are designed to carry current on the heel, and to interrupt it on the toe (Fig. 5). Since the heel does not break the current, it should remain in pretty good shape, though it may discolor. The toe will normally become pitted and discolored. Sometimes drops of molten copper will form beads on the edges of the tips. If these interfere with contactor movement, knock them off with a file; but don't make a practice of filing tips.

If oil gets on the surface of contact tips, it forms a film which collects dirt. When the contactor operates, this oily dirt is pressed into a thin coating on the tip surfaces. If this coating builds up (Fig. 6), it will form a high resistance connection. The tips will overheat, and may even weld together. So, if oil gets on the tips, wipe it off with an oil solvent and file the tip surface very lightly.

Tips on Contact Tips

When a contactor is open, there is a space between the tips. This is called the "tip gap" (Fig. 5). As the tips wear, it gets larger. On most contactors, there is no way of adjusting it. After a contactor repair job, it's wise to measure tip gap. If it is outside limits, the contactor may have been assembled wrong.

If you close a contactor by hand, you will notice that after the tips touch the armature keeps moving until it touches a stop. This extra movement is called "wear allowance" or "wipe." It is necessary if the contactor is to do its job properly. Wipe is a means of making up for tip wear in much the same way as a slack adjuster makes up for brake shoe wear.

When you inspect a contactor, check the operation of the tip lever and wipe spring. You can easily do this by pulling the tip lever away from the armature with your finger. When released, it should snap back into place sharply. Tip wear may cause copper dust to gather on parts of the contactor. This may cause an insulation failure or burnup, so brush it off if you find it accumulating.

Sometimes contactor tips fuse solidly together. This is called "tip welding," and is caused by: (1) tips worn until there is little or no wipe left; (2) weak or missing wipe springs; (3) sluggish contactor operation; (4) dirt on contact tips. You have already learned what to do about all these conditions.

Stop That Arc

When a contactor opens a circuit carrying current, an arc is drawn between the contact tips. This is very hot—like the arc used in electric welding. If we want the contact tips to last any time, we must get rid of the arc as quickly as possible. If the arc is small and weak, it will go out easily when the tips are pulled a short distance apart. If it is large and strong, the story is different. Then the tips must be pulled several feet apart to put the arc out. There isn't room in a locomotive to do this, so we use another trick. An arc can be blown out, just like you blow out a flame. This could be done with a jet of air. On contactors, however, it is simpler and easier to blow it out electrically.

Near the stationary tip of locomotive contactors you will find a "blowout" coil made up of a few turns of heavy strap copper (see Figs. 2 and 4). This coil has an iron core inside it. The current flowing through the contact tips also flows throughout the "blowout" coil and causes the area around the coil to become magnetic. When air arc is drawn as the contactor opens, it will be in this magnetic area. The magnetic action will force the arc to the ends of the tips and out, as if it were blown by an air jet.

The blowout coil or core may be damaged by heating or arcing. Then it cannot do its job and the arc will not be blown out. This will very quickly burn up the contactor. Many such failures are the result of overheated tips. The coil is close up to the tips, so it gets damaged when they overheat. Sometimes this is not noticed when the tips are replaced. Then, soon after the locomotive is dispatched, a road failure occurs.

It's good to blow the arc out from the contact tips, but you must be careful what becomes of it! If it strikes any surrounding equipment, it may do a lot of damage. If it strikes the locomotive frame, it will usually trip the

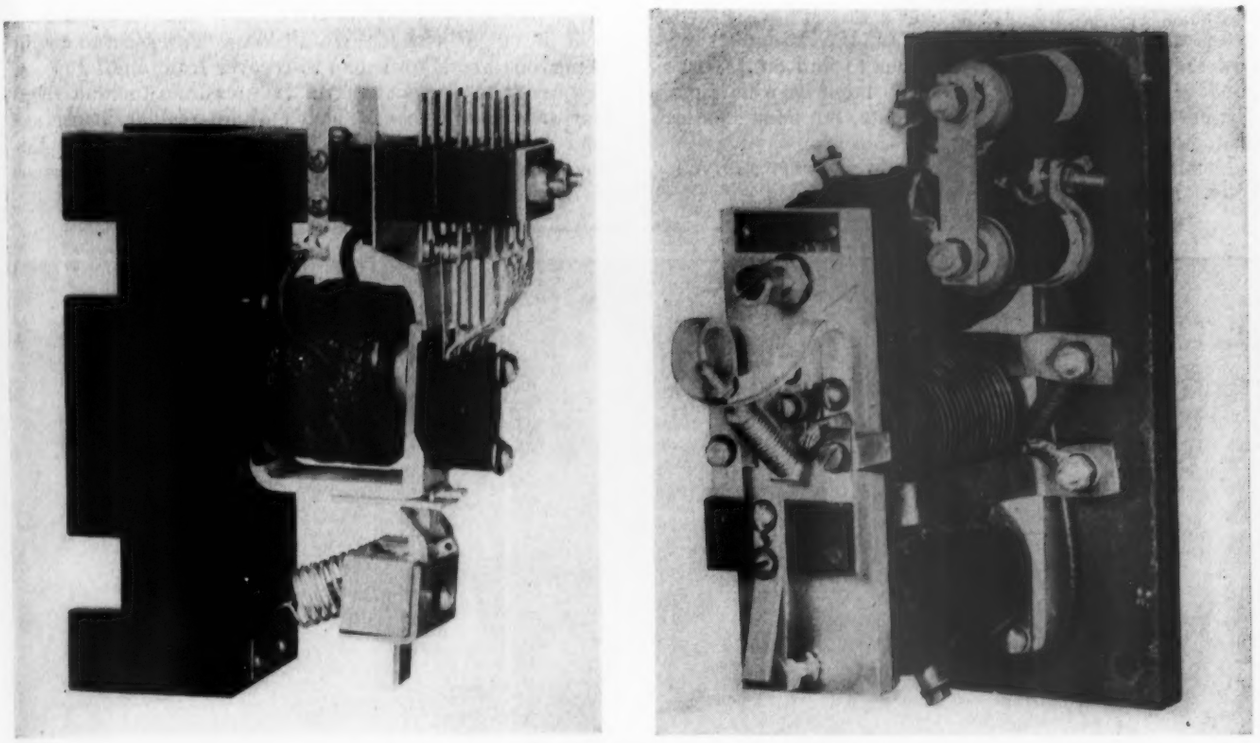


Fig. 7—Two Types of relays commonly used on diesel-elect. locomotives

ground relay. To prevent trouble, a box (arc chute) is used to confine and direct the arc. It is made of material that will not conduct electricity and that will withstand the heat of the arc. Molded asbestos is commonly used, and, in some cases, clay products like fire brick. Most of these materials are easily broken if not carefully handled. Broken arc chutes should be repaired or replaced as soon as found. When the side plates of the arc chutes are burned three-fourths through, they should be repaired or replaced. You can buy cement compounds which are good for filling these burned places. If the outlet of an arc chute gets plugged up, it should be cleaned with a steel brush or putty knife. When putting an arc chute back on a contactor, be careful to see that it is fastened securely and does not bind the contact tips.

Interlocks Follow Through

As you know, there is a "firing order" for the cylinders in your auto engine. Sometimes, it is also necessary to have a "firing order" for locomotive contactors. In this case the "firing order" is set up by means of interlocks. These are small contact fingers (Fig. 2) that work at the same time as the main contacts. They are usually connected in the low-voltage or battery circuit and give a signal when the main contacts operate. Two kinds are common. One is "normally open." That is, the interlock circuits are open when the main contacts are open and closed when the main contacts are closed. The other is "normally closed." That is, the interlock circuits are closed when the main contacts are open, and open when the main contacts are closed. Interlocks, being in low-voltage circuits, usually have silver contact tips to reduce electrical resistance. Oil on these tips will collect dirt. While dirty interlock tips don't overheat, they do fail to make contact. This fouls up the "firing order." So, if you find dirty interlocks, clean them with a clean lintless cloth. Sandpaper and emery cloth should not be used. They leave grains in the surface that keep the tips from making contact.

When you are working around contactors, remember the interlocks are small and easily damaged. Keep an eye on the handle of that wrench. When the job is finished, take a look at the interlocks to see that they haven't been bent.

Loose connections cause trouble on interlocks too. You won't get an overheated connection, but you will get all sorts of queer control operations. A regular check of these connections will help rid your locomotive of these headaches.

On most contactors, the interlock tip gap can be adjusted. Once set, it is seldom necessary to readjust. However, it's good to look at these gaps—you may find a road failure before it happens.

Rarely, you may find contact material building up on an interlock tip. Remove it with an ignition file. As a rule, don't file the tips—it shortens their life. Fingers should be replaced when the silver on the tips begins to wear through.

Remember, interlocks are an important part of control and vital to locomotive operation. You should maintain them like other contactor parts.

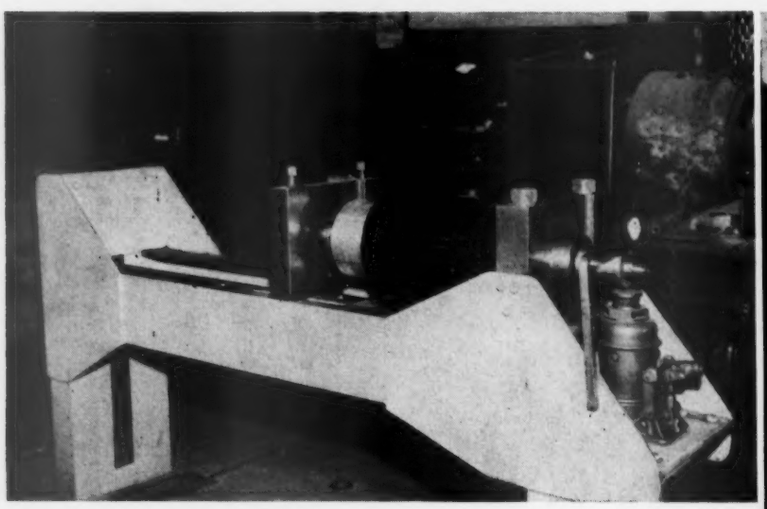
Relays—The Mighty Midgets

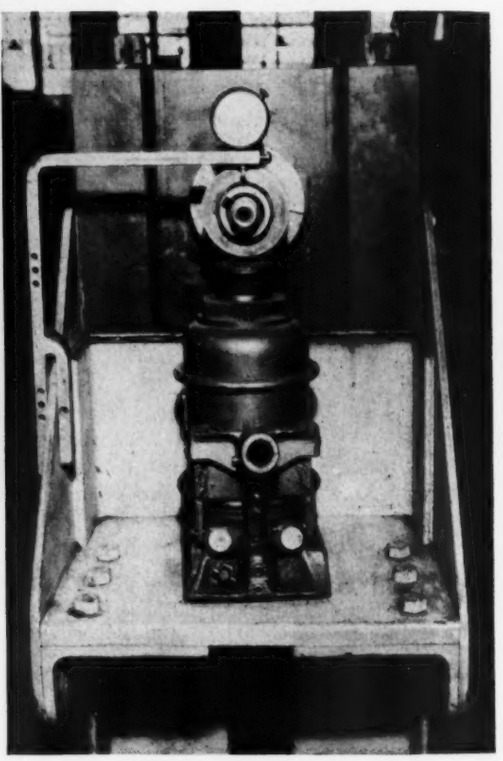
A simple relay looks like a small magnetic contactor. Actually, the main difference is in the job it does. It is a light contactor used to "relay" a signal. It is inspected and maintained like a magnetic contactor. Contact fingers and tips should be treated like contactor interlocks. Most relays are covered to shield them from dirt. What little maintenance is required should be done by a man who knows his job and has the proper tools. Relays just can't be maintained by the old-time "hammer and oil can" method.

Since relays are used for a number of jobs, they come

in many sizes and shapes (Fig. 7). If you don't know how they work, you may be curious to find out. That's good. Look them over, but don't monkey with them. The best rule is "looka alla you wanta, but dona squeeza da tomatoes."

Locomotive control is like the brain and nerves of your body. It has to be in good order or the whole machine will be out of whack. We all know it's easier to avoid a nervous breakdown than to recover from one. Just so, it's easier to prevent control failures than to hunt them out and correct them. That's where regular inspection and maintenance pay off. A proper plan faithfully followed will go a long way toward keeping your locomotives rolling.





Above: An armature in place preparatory to straightening the shaft. Right: The dial gage measures amount and direction of the distortion for straightening with the jack, and checks the finished job for true running.

Armature Shafts Straightened in Place

Armature shafts from 1-hp. motors to 20-kw. generators are straightened in place at the Illinois Central Burnside shops in Chicago by the use of a machine developed and patented by D. K. Pope, electrician at that point.

The machine not only straightens the shaft, but it straightens it at the exact place where it was bent and with a force directly opposite to that which distorted the shaft in service; thus it avoids putting a second bend in the shaft which would compensate for the first bend but would throw the shaft out of balance. The machine also avoids removing the shaft from the armature and the possibility of loosening the fit between the two. The shaft is straightened between the hub of the driving pulley and the adjacent bearing housing, where it normally becomes bent in service.

The machine holds the armature and its shaft in the same way as if it were mounted in its own shaft bearings. It has a dial indicator to tell the amount and direction of distortion and to show when the shaft has been restored to the straight condition.

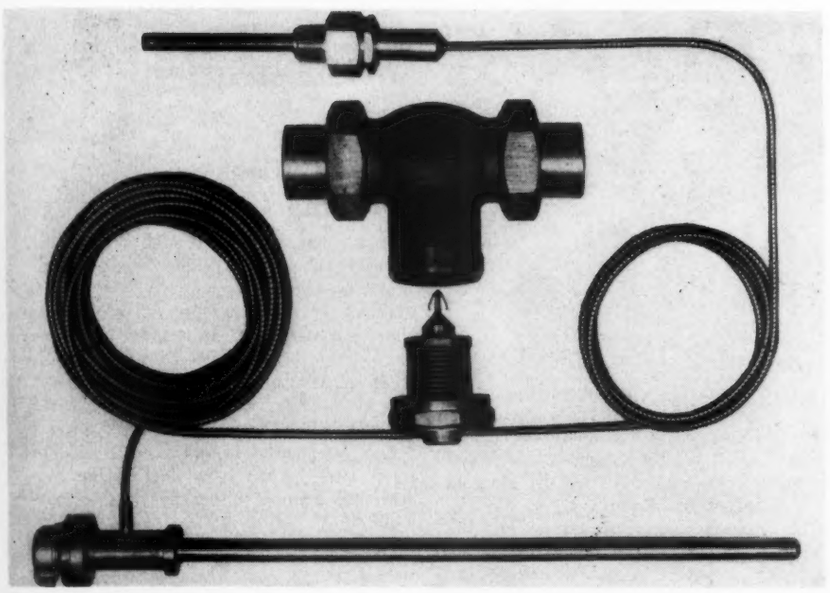
Two mounting blocks are supported by a suitable frame, one of which is fixed in position by bolts while the other slides longitudinally to accommodate different lengths of armatures. The mounting blocks are in two halves joined together with studs and nuts. Each part has a half-bearing for rigidly securing the armature shaft in place during the straightening operation. Bushings are employed to accommodate different sizes of armature shafts.

After the amount and direction of the distortion have been determined, the shaft is straightened cold with a jack set on a bed near the stationary mounting block. During this operation an adapter sleeve fits over the end of the shaft in place of the driving pulley. This prevents damage to the shaft from the application of the straightening force and insures that the force will be applied where it is required.

Normally about .010 in. springback is allowed for. Thus if a shaft is bent .008 in., force is applied by the jack until it is .010 in. beyond straight, or a total of .018 in. If the .010-in. springback assumed is correct, the shaft will then return to true after the force is removed. If the springback turned out to be .015 in., another .005 in. of bend would have to be put in the shaft. If the springback were less than .010 in., say .008 in., the shaft would be revolved 180 deg. and bent back the excess .002 in.

The machine is also suitable for removing the shaft from the armature. For this operation one jack is mounted with the base against the end of the machine opposite the dial gage, while a second jack holds a concave tray for supporting the armature after the shaft has been removed. The armature shaft is held, as in the straightening operation, by the two mounting blocks.

NEW DEVICES



Non-Electric Heat Control

A heat control that operates without electric thermostats, relays, motors, or solenoids, has been marketed by Fulton Sylphon Division, Robertshaw-Fulton Controls Company, Knoxville 4, Tenn. These controls are actuated by steam.

This railway car heat control can economically convert any hot car to a comfortable automatically controlled car. It can be applied to steamheated suburban cars and coaches, or cars of other types. The supply of steam to the floor radiation on each side of the car is regulated by a 1 in. Sylphon modulating, differential control valve which has two temperature control bulbs, each connected to the hot chamber bellows by capillary tubing.

The fresh air bulb is mounted under the car and is responsive to outside air temperatures. This bulb automatically adjusts the car temperature. The car control point is raised from 70 to 75 deg. F. if the outside air drops from 50 to 0 deg. F.

The car body bulb is mounted under a seat and is responsive to car body temperatures. This valve is a modulating controller so when the car bulb is 68 deg. F. the valve is wide open. When the car temperature reaches 70 deg. F. the valve is tightly closed. When the car temperature is between 68 and 70 deg. F., the valve is in some throttled position. The only remaining equipment is an emergency manual shut-off valve and thermostatic traps to drain condensate.

Automatic Dynamic Braking Control

A system of automatic braking control and notchless tractive effort control for Alco-GE road switching, freight and passenger locomotives has been announced jointly by the American Locomotive Company and the General Electric Company, both of Schenectady, N. Y., to maintain braking over the normal speed range. The automatic control is said to provide greater braking capacity on road freight and passenger locomotives, ranging from 2,100 hp. at high speeds to 2,660 hp. at approximately 24 m.p.h.

With automatic control, braking capacity of 1,900 hp. is maintained on four-motor road switchers and capacity of 2,900 hp. is available on six-motor road switchers.

The system eliminates the necessity for the engineman to adjust the braking lever manually at different speeds to avoid exceeding a pre-set limit as shown by the load ammeter or the braking warning light.

From a previous limit of 800 amp. at all speeds, the new system provides a limit of from 800 amp. at high speeds up to 900 amp. maximum on road freight and passenger units.

Notchless tractive effort control, available on Alco-GE 1,600 hp. freight and switching locomotives as a modification, affords variations of speed and tractive effort necessary in hump service and in starting heavy trains under difficult conditions. This device provides a varying limit for tractive effort in any particular throttle notch, by utilizing current limit features of the locomotive control system.

In starting a heavy train under difficult track conditions, the engineman can use notchless tractive effort control to increase tractive effort to the exact point required to move the train without wheel slippage.

◆

Air-Operated Transfer Pump

An air-operated transfer pump has been developed especially for handling diesel lube oil by the Wilkinson Equipment & Supply Corp., 6958 South Wentworth, Chicago 21. It is capable of pumping a 55-gal. barrel of SAE No. 40 within 5 min. time, pumping as much as 18 gal. per min. depending on the viscosity of the fluid handled. The pump also eliminates spilling of oil.

It weighs only 15 lb. which speeds up transfer from one drum to another; fits all standard 2-in. drum openings, and is supplied with an adjustable bung hole adapter and air valve for control of speed. In addition, there is a metering system for constant visual control of quantities pumped.

The pump, it is said, eliminates fire hazards because handling of the fluid is clean, quick and completely enclosed.

In addition to lube oil, the pump will handle such fluids as motor oil, gasoline, naphtha, cleaning solvents, kerosene, etc.

◆

Three Part Nipple Chuck

A chuck, the model 55, which is capable of threading ⅛-in. to 2-in. pipe has been

marketed by Beaver Pipe Tools, Inc., Warren, Ohio. Called the Universal Nipple Chuck, it has three parts—a polished steel body, a sliding plunger and a hardened threaded shank. No wrenches are required to remove the nipple.

Adapters allow for all sizes from ⅛-in. to 1½-in. pipe. No adapter is needed for 2-in. pipe. An inserted pin retains the sliding plunger in working position.

The device can be used four ways: with a pipe machine, a power drive, any pipe vise or a machinist's vise to pay for itself by converting short lengths of pipe into all-thread, close-thread or average nipples.

◆

Machinist's File

A new file for industrial use has been announced by Henry Disston & Sons, Inc., Philadelphia, Pa. Called the Multi-metal file, the device is designed for the machinist who must work on a wide variety of metals. These files have special tooth shapes and spacing so that the same tool will cut aluminum, brass, copper, iron and steel, and other metals. Sides are double-cut; edges are single-cut.

They are packed six to a box, in lengths of 10, 12 and 14 in.

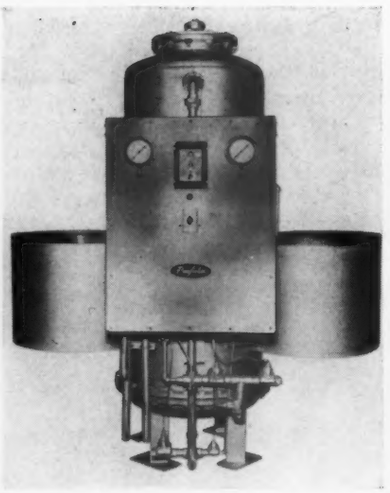
◆

Power Supply System For Cabooses

An alternator-rectifier system, designed to furnish power to cabooses and similar rolling stock for the operation of commutation equipment and other electrical devices, has been developed by the General Electric Company.

This alternator is axle-driven. When operated at a gear ratio of 5.28 to 1, the system will produce 80 amp. d. c. at 40 volts d. c. over a car speed range of 10 to 90 m.p.h. With lower gear ratio and less speed range, the equipment can be made to provide even greater output.

The metallic rectifiers have a special protective coating and are forced ventilated. The control limits both the maximum output current and voltage.



Mono-Bed Demineralizer

The addition to its demineralizing equipment line of a fully automatic Mono-Bed unit has been announced by the Penfield Mfg. Co., Meriden, Conn.

This demineralizer performs all the operations, including the regeneration cycle, completely automatically. Whenever the effluent's conductivity falls below standard, the treated water is automatically discharged and lights (or other warning system) signal the need for activation of a regeneration cycle.

The simple turning of a single dial or switch then puts the unit through its regeneration cycle automatically, including rinsing and recutting in the effluent when desired resistivity is reached.

The unit employs the ion exchange technique, a combination of cation and strong anion resins mixed in a single tank through which the raw water passes.

It is available in flow rates from a few gallons per hr. to 5000 gal. per hr. and up. The device requires no steam power and provides a treated water effluent with a mineral content of virtually zero hardness.

◆

Locking Plug For Portable Extensions

Corlock is the name given to a heavy-duty locking plug now being produced by Cornish Wire Company, Inc., 50 Church street, New York 7. A waterproof, shock-resistant jointure of the plug and wire is achieved by molded rubber construction. The plug is approved by Underwriters' Laboratories for 20 amp. at 250 volts and 10 amp. at 575 volts. It is available in flexible cord sizes as follows: 18-3 and 16-3 SJ; 18-3, 16-3, 14-3 and 12-3 in S, SO and SJO hard-service coverings. A twist upon plugging in establishes sure connection that stays unbroken until it is desired to disconnect.

◆

Railway Car Cleaning Compound

A new compound called Mabros has been developed by the Phillips Scientific Laboratories, North Arlington, N. J. It is claimed that when the product is added to the wash water for railroad cars, 90 per cent of the time and effort is saved. While washing, it produces corrosion resistance, weatherproofing, roadfilm retardant for the carbody, glass, metal, etc.

One teaspoonful is added per bucket of water and the car is washed in the conventional manner, either by hand or machine.

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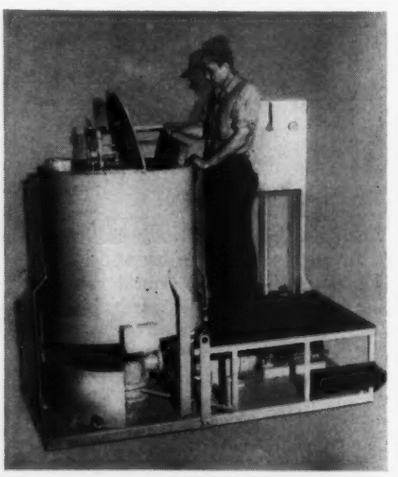
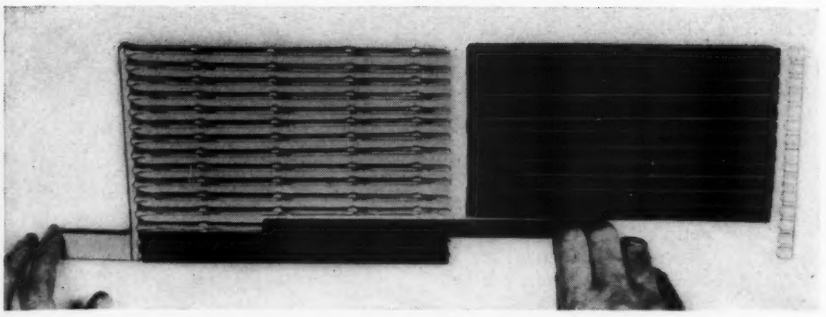


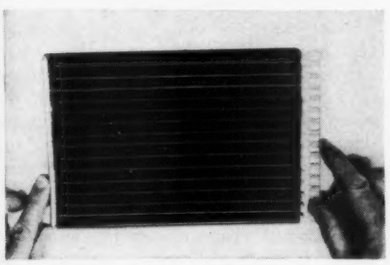
Filter Cleaning Machine

Permanent-type air-filter elements used on Diesel locomotives and passenger cars may now be cleaned by a machine developed by the Paxton-Mitchell Company of Omaha 5, Neb. The machine, known as the Safe-N-Ezy Washer, when operated by one man working at a normal rate of speed, can clean 600 or more 19½-in. by 19½-in. by 2⅛-in. air filters in an eight-hour day.

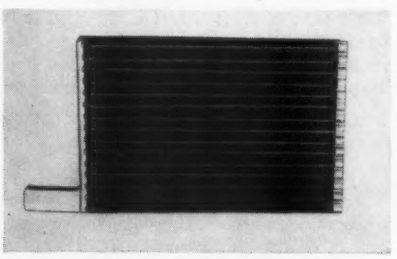
Even the dirtiest filters come out clean when processed in the Safe-N-Ezy washer-oiler because the machine works on the principle of centrifugal force. Filters spin in an interior basket of the washer throughout the complete cycle to become cleaned, rinsed, spun dry and oiled all in one continuous operation. Floor space required by the cleaner is 6 ft. 10 in. by 4 ft. 4 in.



Silvium metal grid core rods being inserted into slotted hard rubber tubes



After packing active material into slotted hard rubber tubes, the polyethylene bottom bar is put on so that each tube is sealed by its individual plug



The assembled positive plate of the improved Exide-Ironclad battery for industrial use

Heavy Duty Storage Battery

The Electric Storage Battery Company, Philadelphia, has announced that the life of its Exide Ironclad industrial storage batteries used for railway motive power and other heavy duty service, will be prolonged by six outstanding improvements, including a new silver alloy grid metal, and a non-corroding permanent positive-plate tube sealer.

Corrosion of the positive-plate grid is one of the principal causes of battery failure, and the manufacturer states that the introduction of a new alloy, Silvium, in the construction of the positive-plate grid of the improved Exide-Ironclad battery, reduces the corrosion factor and assures a longer positive grid life. Silvium is an alloy of silver, lead and other components and is highly resistant to corrosion.

Another cause of curtailed battery life, which has always plagued storage battery manufacturers, is the loss of the active material from the positive plate. When it becomes sediment in the bottom of the cell, it represents lost capacity and reduction in battery life. There also is the threat of possible trouble from short circuits within the battery by an accumulation of loose active material.

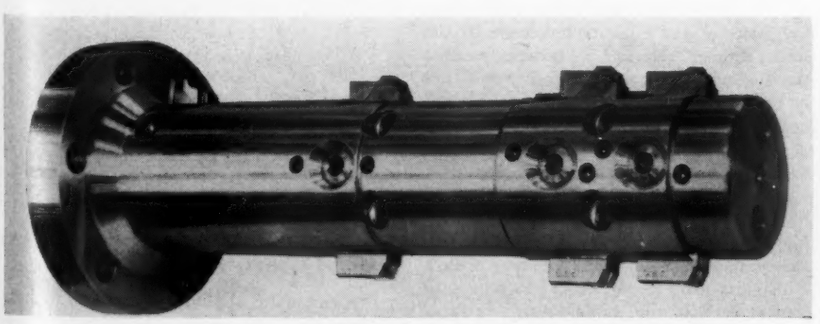
The Exide grid is made up of metal core rods which are inserted in slotted hard rubber tubes. Active material is then packed into the tubes surrounding the rods. The slots in the tube permit free access of the electrolyte to the active material, but they are fine enough to prevent it from washing out.

The bottoms of the tubes were formerly sealed with an alloy bar. After considerable service life, however, corrosive action on this metal bar closing the tube bottoms would eventually breach the seal. Active material would then seep out and be deposited in the bottom of the container. Molded polyethylene is now used to replace the metal bar and seal in the tubes at the bottom against loss of active material. The new tube sealer is non-corroding, and is unaffected by the electrolyte or electrolytic action. It is pointed out that high capacity is thus retained for a longer working life because the active material is held in place in the tube.

In addition, polyethylene is an insulating material. Extending across the entire bottom of the plate, it acts as a safeguard against shorting between plates. The elimination of metal at the bottom of the positive plates, it is claimed, assures better negative plate performance because of low local action and the reduction or elimination of shedding of active material.

The other improvements in the Exide-Ironclad battery are a new homogeneous sealing compound; a seamless shock proof jar; unbreakable plastic vent plugs, and a corrosion and impact resistant plastic steel tray coating.

Now available, the new improved Exide-Ironclad battery will be sold at no increase in price.



Car Wheel Boring Tool

A new device, the "Three-In-One" Car Wheel Boring Tool, has been perfected to prevent bar deflection and machine damage when boring cored hub wheels in railroad repair shops.

Operation of the tool, designed by the Davis Boring Tool Division, Giddings & Lewis Machine Tool Company, Fond du Lac, Wis., is embodied in a set of extra cutters located between the first roughing cutters and the finishing cutters. These intermediate cutters provide for continuous cutter contact during the boring cycle regardless of the openings in the wheel hub.

The apparatus is equipped with micrometer expansion blocks in which cutters of solid tungsten carbide are used. These blades are rigidly supported which prevents chattering and cutter breakdown when boring.

Adjustment of cutters to required bore size is easily made. As much as 1⅛-in. diametrical adjustment is possible. Approximately 0.03 in. of metal is removed in the finishing cut and the complete boring cycle is only 2.3 min. per wheel.

◆

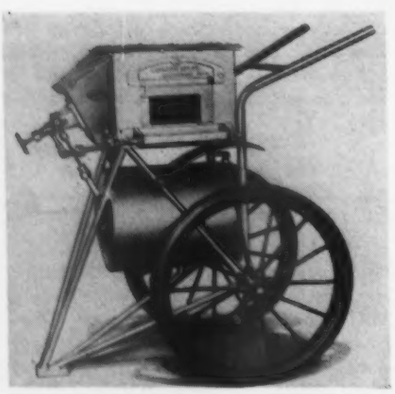
Glass Fiber Fire Shield

Effective protection against radiant heat and light weight are a few of the advantages of a resilient Ultralite glass fiber insulation fire shield developed by Gustin-Bacon Manufacturing Company, Kansas City, Mo. The shield, according to its maker, affords protection to firefighters within a few feet

of a fire, enabling them to direct operations, turn off valves, effect rescues and fight the fire. Firemen have been able to approach within 18 in. of a high pressure gas fire (850 lb. per sq. in. from a 6-in. pipe) in safety.

The user maintains vision through a peep hole at eye level. His face is shielded by copper wire which disseminates and dissipates heat. A self-sealing opening for a hose nozzle can be cut through the shield.

◆



Rubber-Tired Rivet Forge

Recently made available is a line of rivet forges equipped with semi-pneumatic tires. These units, introduced by the Johnston Mfg. Co., Minneapolis, Minn., are designed for heating rivets prior to use in fastening operations. They are equipped with a non-clogging vacuum oil burner.

The tires absorb shock and vibration and reduce noise when the forge is moved to a new location. These forges can also be equipped with regular steel wheels, and steel-wheeled models now in service may be converted. They are also available in stationary types.

Stick-Type Wax Lubricant

A solid lubricant has been marketed for lubrication of cutting tools, threaded metal fastenings and other metallic forming tools used in production manufacturing, tool rooms and maintenance workshops. The product called Tool Saver is a formula of wax ingredients and is compounded by The DoAll Company, Des Plaines, Ill.

According to the manufacturer, it helps prevent detrimental abrading, scoring or burning of a tool or the work and noticeably improves surface finish on the machined material.

A pound of the product is supplied in a handy push-out cardboard dispenser tube measuring 11 in. long by 2 in. in dia. It is supplied directly to the cutting edges of the tool or to the surface of the material that is to be machined.

◆

Car Heating Conduit Seal

Recently introduced for use in railroad passenger car heating systems carrying 400 deg. F. steam under 250 lb. pressure is a new conduit seal devised by the Vapor Heating Corporation, Chicago. It utilizes Hycar rubber, developed by the B. F. Goodrich Chemical Company, Cleveland, Ohio, as the sealing material and a compound made by the Roth Rubber Company, Chicago, so that the sealing action and flexibility will not be affected by hot steam. This seal will not deteriorate in fluctuating steam temperatures and the effects of sub-zero weather when the car is standing idle.

Each metallic conduit between the cars has eight swivel joints to absorb the jolting action of moving cars. This 2¾-in. outside diameter, ⅛-in. wall thickness with a 1-in. skirt asbestos-faced seal can be utilized at each of the joints.

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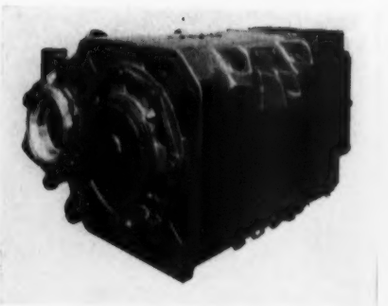
Traction Motor For Diesel Electric

Designated as Form GE752E, a new model traction motor for diesel-electric locomotives has been announced by the General Electric Company. It includes several improvements in the present GE752.

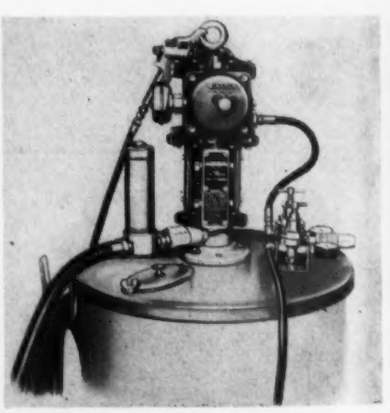


The pinion-end armature head has been redesigned to make it more sturdy and to permit easier cleaning of all armature ventilating holes. A keyless armature shaft has been used to give greater strength and to permit more accurate line-up on the commutator and armature core, a feature that simplifies commutator repairs. Improved varnish treatment of the armature gives a smoother surface which is easier to keep clean.

Triple-deck banding of the armature, which has already proved successful in service, gives added protection against damage from excessive motor speed during wheel slip. The armature bearing caps are equipped for sealed grease lubrication eliminating the need for grease fittings. This refinement eliminates the need of adding lubricants between overhauls.

Nose wear-plates are easier to apply because they are now welded instead of riveted to the brackets. Oil waste and spillage on the axle linings have been reduced by the addition of an oil return groove.

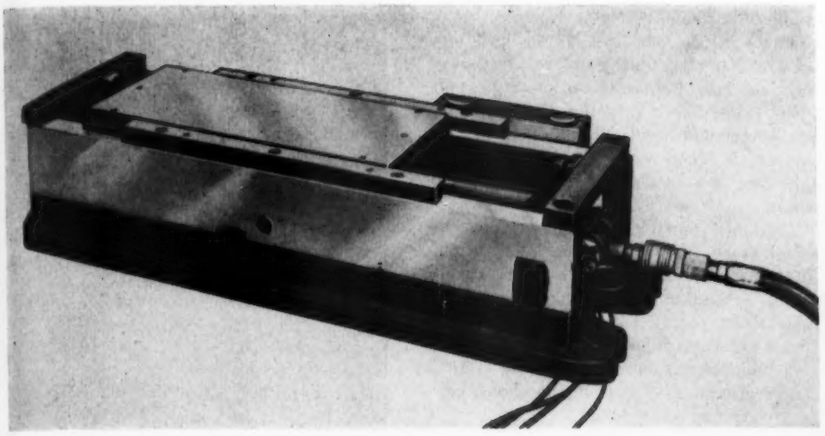
◆



Air-Operated Pumps

For automatic application of heavy to light materials, such as sealers, adhesives, roofing, waterproofing, insulating and caulking compounds, the Lincoln Engineering Co., St. Louis, Mo., has introduced a line of air-operated pumps and accessories.

A total of eleven models provide different systems for spray gun, pole gun and flo-gun applications. They are available for use with original 400 lb. and 100 lb. drums, and with a container for 5 gal. material package.



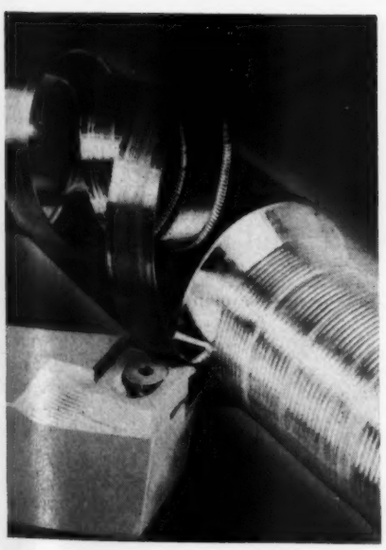
Air Powered Work Feeder

A new 2-station electrically controlled, air-powered work feeder, called the Transfeed is being added to the line of devices made by the Bellows Co., Akron 9, Ohio.

The device consists of a movable steel table top $1\frac{1}{16}$ in. thick by $5\frac{1}{4}$ in. wide by 12 in. long which is guided between dovetail ways. Power for the transverse motion of the table top is supplied by an air motor with a built-in valve.

This feeder has a 6-in. transverse positioning stroke, which allows the operator to load and unload work at one end of the table while the machining operation is taking place at the other end. The unit is equipped with adjustable positive stops.

The work feeder is a packaged unit with built-in controls. It can be operated by a push-button, foot switch, or interlocked with other Bellows devices or other machine elements. All electrical connections and switches are housed in a switch box on the side of the base casting.



Clamp-On Turning Tool

A turning tool known as "Hefti-Cut" has been designed for use in turning, facing, shaping and boring of large diameters. Cuts 1-in. deep at $\frac{3}{16}$-in. feed can be taken in S.A.E. 4140 carbon steel at 88 surface ft. per min.

The device, manufactured by The DoAll Company, Des Plaines, Ill., consists of an alloy steel shank which holds carbide blanks. A two-way blank-positioning adjustment, which includes an adjustable clamp, allows a greater portion of the blank to be used before it must be discarded because a smaller clamping area is required.

Any manufacturer's standard blanks can be used for the unit. Also available are blanks with preformed angles. Use of these blanks results in an appreciable reduction in grinding time and diamond wheel wear, according to the manufacturer.

These devices can be obtained in three offsets for various turning, facing and heavy shaping and boring operations. Each style is available in several sizes to meet requirements for lighter or heavier jobs.

◆

Heat Resisting Aluminum Paint

The compound Super-Hot is a ready-mixed aluminum paint that can be applied to practically any metal surface. It becomes permanently bonded to this surface when subjected to heat of from 500 to 1,600 deg. F.

Originally intended to protect metal surfaces where extreme heat is required, the product is a new development of the Sheffield Bronze Paint Corporation, Cleveland 19, Ohio. It will add a protective surface to furnaces, pipes, boilers, ovens and other metal surfaces withstanding 1,600 deg. F. The greater the heat, the more permanent the bond as the paint alloys itself to the metal surface with the application of heat.

This aluminum paint imparts a heat-resistant, anti-corrosive, weather-resistant, protective coating. It may be applied by brush, sprayed or dipped and air dries within 30 min., after which time heat can be applied. Although best results are obtained when application is made on clean, dry surfaces, the paint may be applied to finishes which are rusty, moderately greasy or oily.

◆

Hot Radiography Inspection Technique

The taking of X-ray photographs of large welded pipes, valves, and similar units at temperatures as high as 1,200 deg. F. is now possible through the technique of hot radiography, developed by Sam Tour & Co., New York 6.

It is stated that the method eliminates several time-consuming steps necessary for the usual radio-graphic inspection techniques. Hot radiography, which can be accomplished on the hot pipe, makes it practical to interrupt the welding operation to inspect the weld root where most flaws occur. Additional time is also saved because, if defects are found, it is only necessary to chip away a partially-completed weld, rather than a finished weld.

◆

Portable Diesel-Engine Pyrometer

A portable diesel-engine pyrometer, designed for test purposes and for installations where no permanently mounted pyrometer is available, has been introduced by The Bristol Company, Waterbury 20, Conn. It is designated the model 4-321.

The thermocouples can be installed in each cylinder and in the main exhaust line. By inserting the pyrometer prongs into the corresponding receptacles in the terminal board of the thermocouple, the temperature can be checked at any time.

High Capacity Gear Shapers

Twelve new design features to provide improved performance, reduce tool change time and facilitate machine maintenance, are claimed for the Series 1800 line of Shear-Speed gear shapers, introduced by the Michigan Tool Company, Detroit 12.

The line now includes four models: 1833, 1853, 1873 and the 18105. This latter model, with a 5-in. cutter head stroke, replaces the former model 18103 which had a 3-in. maximum stroke. The models have capacities ranging from 1-in. dia. to 10-in. dia. gears with maximum face widths ranging from 2¾ in. to 4½ in. These shapers are designed for cutting spur gears, involute, angular, straight-sided and inverted splines, sliding clutches, toothed parts, ratchets and special forms.

◆

Single Phase Vertical Hollowshaft Motors

A series of single-phase hollowshaft motors, types SCU-C and SCU-R, has recently been added to the line of U. S. vertical motors, by U. S. Electrical Motors, Inc., Los Angeles 54. An improved and simpler method of disconnecting the starting capacitors has been initiated into this line of motors—namely, the accelerating type relay. Formerly a centrifugal switch, with its many moving parts and critical adjustment was used.

The relay now used gives a fast, clean contact break. The large double break contacts insure long and trouble-free life. To avoid any possibility of bearing grease working into the relay, or foreign particles being blown into the contact points by the efficient ventilating system, the relay was designed into the easily inspected, split-type box located on the side of the motor.

Available from 1½ to 5 hp., with speeds of 1,800 or 3,600 r.p.m., the SCU-C and SCU-R motors offer such features as asbestos protection of windings, Lubriflush lubrication, normalized castings, solid centricast rotor, downdraft ventilation, adjustable hollowshaft, reverse protection clutch, conservatively rated capacitors and weatherproof housing.

◆

Light Weight Spray Gun

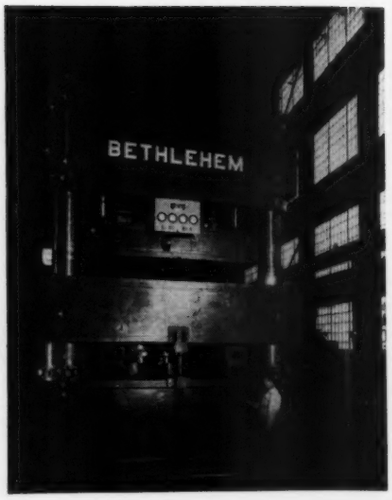
A spray gun, designated as the Type EGA, with sensitive controls for fine spraying and suitable for small refinishing jobs, stenciling, blending and decorative work, has been introduced by the DeVilbiss Company, Toledo, Ohio. Its spray pattern can be adjusted to practically pin-point size.

Its body is an aluminum die casting. It can be used with standard glass jar fluid containers of 2, 4, 6 or 16 oz. capacity. The actuating trigger is designed for either left or right-hand operators.

◆

Double Action Hydraulic Press

A 4,000-ton upstroke double action hydraulic press, which can be operated as a single action unit by clamping the blankholder to the top platen has been perfected for railway equipment manufacture. It was designed to meet exacting requirements regarding platen deflections in hot-forming various car body parts and built by the Bethlehem Steel Company, Bethlehem, Pa.



In double action, it has adjustable blankholder pressure providing a range from zero to 1,000 tons. Its minimum stroke is 24 in. and maximum is 48 in.

The press has a main ram of 58 in. dia. and two smaller lifting rams and is designed to operate on a primary pressure system of 1,500 lb. per sq. in. which can be boosted to 2,250 and 3,000 lb. per sq. in. through two intensifiers. A force of 2,000, 3,000 or 4,000 tons can be exerted.

The unit has an overall height of about 33 ft., including a basement section, and will operate at a speed of 2½ pressing cycles per min.

◆

Blind Lock Bolts, Rivets And Tool for Applying

The Huck Manufacturing Company, Detroit 7, has developed a series of blind lock bolts which have been used extensively in aircraft structures where aluminum alloy blind rivets do not possess sufficient strength. They are available in ¼ in. and 5/16-in. sizes which have a single shear ultimate allowable strength of 4,990 lb. and 8,190 lb., respectively. This company also produces a series of blind rivets and lockbolt stumps which are companion parts to the lock bolt.

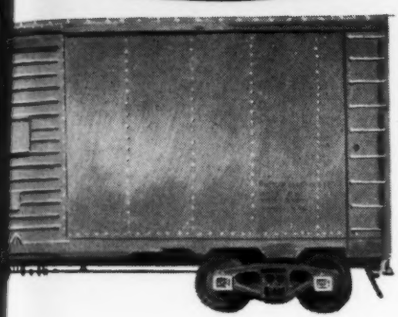
Another product, recently announced by the same company is an angle adapter designed to expand the scope of blind riveting applications to additional assembly and maintenance operations.

The device, when used with a hand riveting tool or an air riveter, is said to simplify assembly of previously inaccessible deep channels and hard-to-reach corners.

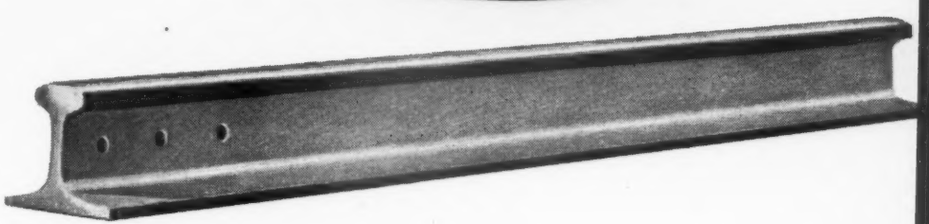
With the adapter, an operator can drive ⅛ in., 5/32 in. and 3/16 in. dia. self plugging or pull through blind rivets in a clearance space of only 4 in. from nose of riveting tool to back face of the adapter. This unit fits into a Huck No. 93 Air Riveting Tool or a No. 94 Hand Riveting Tool.

how we do it

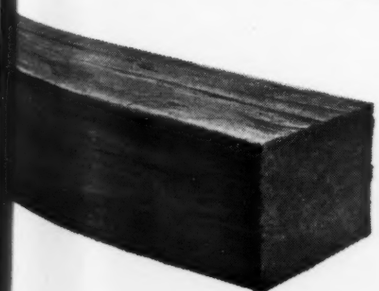
50-ton Boxcar — UP 103%



Rails — UP 85%

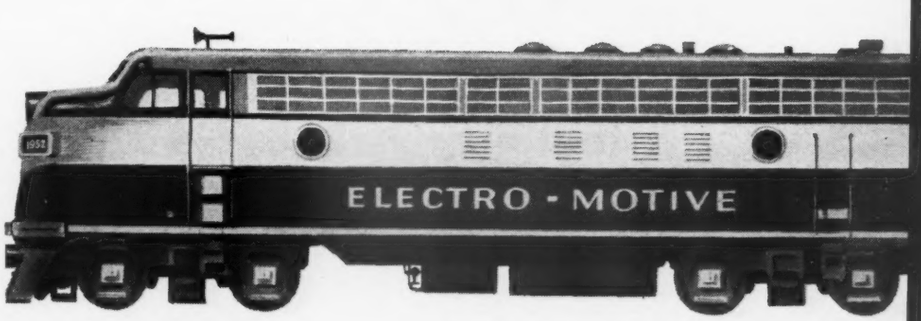


Crossties — UP 112%



BUT the price of a General Motors Diesel Unit —

UP ONLY 32%*



*—*Up only 18.8% on a horsepower basis*

better off with

GENERAL MOTORS LOCOMOTIVES

NEWS

A.A.R. Board Approves New Research Facilities

"To enlarge facilities for an accelerated program of railroad research," the board of directors of the Association of American Railroads has authorized construction of another building at the A.A.R. Central Research Laboratory at the Illinois Institute of Technology in Chicago. This was announced by William T. Faricy, A.A.R. president, following a recent meeting of the board at Washington, D. C.

The new building will cost approximately $350,000, Mr. Faricy said, and will be located north of the present A.A.R. laboratory. It will be used primarily to house mechanical research.

The A.A.R. president explained that the newly authorized laboratory will be devoted entirely to working laboratory space, with administrative offices remaining in the present central laboratory. "The additional space will not only expand facilities vitally needed for research projects but also will speed up the tempo of present experimentation," Mr. Faricy declared.

It has been the policy of the A.A.R. also to utilize outside research organizations in conducting research. This policy will be continued. Work will also be continued in many railroad laboratories, through A.A.R. technical committees, and in the field, where tracks and rolling stock are subject to tests under operating conditions.

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of March		3 months ended with March	
		1952	1951	1952	1951
3	Road locomotive miles (000) (M-211):				
3-05	Total steam	18,855	28,995	58,697	82,433
3-06	Total, Diesel-electric	27,221	22,032	78,158	60,967
3-07	Total, electric	821	878	2,399	2,415
3-04	Total, locomotive-miles	46,913	51,915	139,274	145,831
4	Car-miles (000,000) (M-211):				
4-03	Loaded, total	1,718	1,851	5,006	5,102
4-06	Empty, total	902	925	2,680	2,449
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01	Total in coal-burning steam locomotive trains	33,635	49,497	105,902	138,767
6-02	Total in oil-burning steam locomotive trains	8,549	13,373	25,332	35,450
6-03	Total in Diesel-electric locomotive trains	76,045	62,028	216,007	169,037
6-04	Total in electric locomotive trains	2,329	2,434	6,646	6,610
6-06	Total in all trains	120,605	127,374	353,983	349,939
10	Averages per train-mile (excluding light trains) (M-211):				
10-01	Locomotive-miles (principal and helper)	1.04	1.05	1.04	1.05
10-02	Loaded freight car-miles	40.30	39.60	39.60	39.00
10-03	Empty freight car-miles	21.10	19.80	21.20	18.70
10-04	Total freight car-miles (excluding caboose)	61.40	59.40	60.80	57.70
10-05	Gross ton-miles (excluding locomotive and tender)	2,824	2,724	2,799	2,675
10-06	Net ton-miles	1,310	1,263	1,303	1,253
12	Net ton-miles per loaded car-mile (M-211)	32.60	31.90	32.90	32.10
13	Car-mile ratios (M-211):				
13-03	Per cent loaded of total freight car-miles	65.60	66.70	65.10	67.60
14	Averages per train hour (M-211):				
14-01	Train miles	17.80	16.90	17.40	16.60
14-02	Gross ton-miles (excluding locomotive and tender)	49,615	45,401	48,145	43,916
14	Car-miles per freight car day (M-240):				
14-01	Serviceable	45.50	48.50	45.40	45.30
14-02	All	43.30	46.40	43.30	43.30
15	Average net ton-miles per freight car-day (M-240)	925	986	928	940
17	Per cent of home cars of total freight cars on the line (M-240)	42.50	35.80	41.30	34.90
	PASSENGER SERVICE (DATA FROM I.C.C. M-213)				
3	Road motive-power miles (000):				
3-05	Steam	7,591	11,404	23,803	34,299
3-06	Diesel-electric	18,367	16,189	53,662	46,231
3-07	Electric	1,675	1,706	4,973	4,851
3-04	Total	27,637	29,300	82,446	85,311
4	Passenger-train car-miles (000):				
4-08	Total in all locomotive-propelled trains	273,823	285,378	816,254	821,015
4-09	Total in coal-burning steam locomotive trains	39,594	60,888	126,502	181,791
4-10	Total in oil-burning steam locomotive trains	26,224	34,533	78,381	101,872
4-11	Total in Diesel-electric locomotive trains	189,061	171,356	555,948	485,680
12	Total car-miles per train-miles	9.74	9.60	9.73	9.51
1	Freight yard switching locomotive-hours (000):				
	YARD SERVICE (DATA FROM I.C.C. M-215)				
1	Freight yard switching locomotive-hours (000):				
1-01	Steam, coal-burning	909	1,406	2,865	4,088
1-02	Steam, oil-burning	174	263	514	740
1-03	Diesel-electric[1]	3,234	3,036	9,520	8,557
1-06	Total	4,340	4,732	12,971	13,465
2	Passenger yard switching hours (000):				
2-01	Steam, coal-burning	33	54	104	161
2-02	Steam, oil-burning	12	14	36	41
2-03	Diesel-electric[1]	258	250	767	712
2-06	Total	337	354	1,008	1,014
3	Hours per yard locomotive-day:				
3-01	Steam	7.00	8.40	7.40	8.40
3-02	Diesel-electric	16.80	18.20	16.90	17.80
3-05	Serviceable	14.40	14.90	14.60	14.70
3-06	All locomotives (serviceable, unserviceable and stored)	12.50	12.90	12.70	12.70
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.74	1.76	1.79	1.82
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.76	0.77	0.77	0.77

[1] Excludes B and trailing A units.

Coordinated Association Programs

THE three-day meeting of the Coordinated Mechanical Associations and the Electrical Section, A. A. R. Mechanical and Engineering Divisions will be held this year September 15, 16 and 17 in Chicago. The mechanical associations are the Air Brake, Master Boiler Makers', Car Department Officers', Fuel and Traveling Engineers' and the Locomotive Maintenance Officers'. The meetings of four of these associations and those of the Electrical Section will be held at the Hotel Sherman and one mechanical association will meet at the La Salle Hotel. There will be an exhibit of electrical products at the Hotel Sherman under the auspices of the Railway Electric Supply Manufacturers' Association. The afternoon of Tuesday, September 16 will be set aside for the inspection of the exhibits by attending members.

The officers of the coordinating committee of the Coordinated Mechanical Associations which consist of the presidents and secretaries of the railway associations and the exhibiting organization are: Chairman, J. P. Morris, general manager, mechanical department AT&SF; vice-chairman, F. K. Mitchell, manager equipment, New York Central system, and secretary, C. F. Weil, American Brake Shoe Company. W. E. Lynch, General Electric Company, is president of Railway Electric Supply Manufacturers' Association and J. C. McPrice (Allen-Bradley Company) is secretary-treasurer.

The programs of the several associations appear below. Central Daylight Saving Time is shown on all programs.

Air Brake Association

MONDAY, SEPTEMBER 15

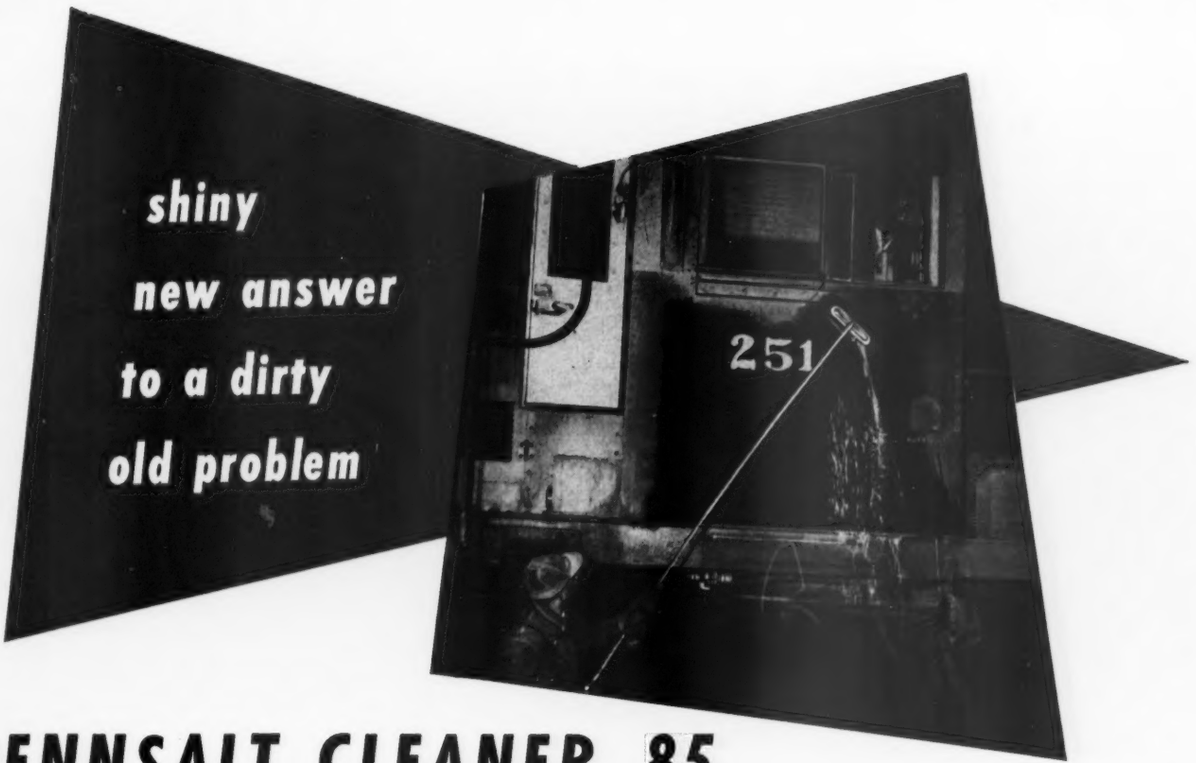
10 A.M.

Address by President K. E. Carey.

Secretary's report.

Proper procedure of repairing and Handling Air Brake Equipment—Central Air Brake Club.

To Create, by Association, a Closer Interest of Air-Brake Men, by G. W. Misner, Westinghouse Air Brake Company.



PENNSALT CLEANER 85

for EXTERIOR WASHING of DIESELS

You're a diesel maintenance man? Well, let's take a good look at one of your headaches . . . the road or yard engine picking up soot, grease, road dirt and even insects while in service. Not only unsightly . . . but actually a constant fire hazard.

Now comes a handy new answer to this dirty old problem—Pennsalt Cleaner 85. Mildly alkaline—because you know that's best for grease cutting ability on painted surfaces. Streak-free—because you know how important that is in window cleaning. Yet this hard-working cleaner is designed for safety to painted surfaces.

Economical—because you can use it at about half the strength most other cleaners require (1 to 2 oz./gal. against 4 oz./gal. for competitive products). Works well as a manual cleaner or in automatic washers.

Pennsalt Cleaner 85 is carefully compounded to cut grease and dirt away fast, float it off in the abundant suds. It's a dry, free-flowing powder, quickly soluble in hardest water . . . mild to hands . . . rinses clean in a hurry.

For a real clincher, try a side-by-side test with Pennsalt Cleaner 85. Your Pennsalt Sales-Service representative will be glad to help you set up competitive tests. Use the handy coupon for more information. Maintenance Chemicals Department, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

Maintenance Chemicals Department
Pennsylvania Salt Manufacturing Co., 1010 Widener Building, Phila. 7, Pa.
Please send more information on Pennsalt Cleaner 85 for economical locomotive cleaning to:

Name_____ Title_____

Company_____

City_____ Zone_____ State_____

Pennsalt Chemicals

Methods of Measuring System Leakage—St. Louis Air Brake Club.

2 P.M.

Freight and Passenger-Train Handling and Dynamic Braking, T. H. Bickerstaff (chairman), supervisor air brakes, Atchison, Topeka & Santa Fe. (Joint session with R.F. & T.E.A.)

TUESDAY, SEPTEMBER 16

9 A.M.

Address—J. W. Hawthorne, general superintendent motive power and equipment, Atlantic Coast Line.

Air Leakage on the Individual Car, by Martin Alger, Jr., New York Air Brake Company.

Standardization of Air-Brake Equipment for Diesel and Turbo-Electric Locomotives, C. E. Miller (chairman), supervisor air brakes and steam heat equipment, New York Central System.

Report Approved Maintenance Practice Committee, F. W. Dell (chairman), Grand Trunk Western.

The Release Control Retainer as a Means for Better Braking—Manhattan Air Brake Club.

WEDNESDAY, SEPTEMBER 17

9 A.M.

The Brake Cylinder Release Valve, by L. A. Stanton, general air-brake instructor, Great Northern.

Maintenance and Repairs of Diesel Locomotive Air Compressors—Pittsburgh Air Brake Club.

Symposium on Automatic Freight-Car Slack Adjusters.

2 P.M.

Completion of papers and discussion of committee reports.

Election of officers.

Unfinished business.

Master Boiler Makers' Association

MONDAY, SEPTEMBER 15

10 A.M.

Address—President Harry C. Haviland.

Report of Executive Board.

Financial report.

Secretary-Treasurer's report.

2 P.M.

Address—William C. Wardwell, superintendent equipment, New York Central System.

Report on Topic No. 2—Study and recommendations for water tanks on diesel locomotives to better facilitate inspection and washing. S. E. Christopherson (chairman), retired supervisor of boiler inspection and maintenance, New York, New Haven & Hartford.

Report on Topic No. 1—Study of the advantages and disadvantages of steam heat plants, A. E. DeForest (chairman), assistant to superintendent of equipment, Michigan Central.

TUESDAY, SEPTEMBER 16

9:30 A.M.

Report of Committee on Law.

Address—E. H. Davidson, director, Bureau of Locomotive Inspection, I.C.C.

Report on Topic No. 3—Study and recommendations on method of staying side sheets and crown sheets with view to eliminate threading holes, F. E. Milligan (chairman), general boiler inspector, Canadian Pacific.

Election of officers.

WEDNESDAY, SEPTEMBER 17

9:30 A.M.

Report of Executive Board.

Address—C. T. DeWitt, superintendent of safety, Northern Pacific.

Report on Topic No. 4—Study and recommendations for the welding and brazing of diesel locomotive and tender parts, Joseph Michne (chairman), welding instructor, New York Central.

History, Progress and Development in the Manufacture and Repair of Locomotive Boilers and Tenders, by C. B. Peck, editor, Railway Mechanical and Electrical Engineer.

Water treatment as presented and discussed by the Master Boiler Makers' Association during the past 50 years, by Carl A. Harper, general boiler inspector, Cleveland, Cincinnati, Chicago & St. Louis.

2 P.M.

Report of Committee on Memorials.

Report on Topic No. 5—What can the boiler supervisors do to better educate themselves for positions other than boiler supervisor, F. E. Godwin (chairman), system chief boiler inspector, Canadian National.

1953 meeting topics.

Report of Committee on Resolutions.

Locomotive Maintenance Officers Association

MONDAY, SEPTEMBER 15

10:30 A.M.

Apprentice Training—Committee on Diesel Personnel Training, E. V. Myers (chairman), superintendent motive power, St. Louis-Southwestern.

Thirty-Five Years of Progress in the Enforcement and Observance of Laws Intended to Improve the Safety and Efficiency of Railway Operation, by W. J. Patterson, member, Interstate Commerce Commission.

2 P.M.

Committee Report—Oil Leaks, Crankshaft and Bearing Failures, J. W. Luke

ORDERS AND INQUIRIES PLACED FOR NEW EQUIPMENT SINCE THE CLOSING OF THE JULY ISSUE

DIESEL-ELECTRIC LOCOMOTIVE ORDERS

Road	*No. of units*	*Horsepower*	*Service*	*Builder*
Bessemer & Lake Erie	10A[1]	1,500	Road	Electro-Motive
	8B[1]	1,500	Road	Electro-Motive
	3[1]	1,500	Road switch	Electro-Motive
	2[1]	1,600	Switch	Baldwin-Lima-Hamilton
	2	1,000	Switch	Alco-G.E.
Central of Georgia	15[2]	1,600	Road switch	Alco-G.E.
Chesapeake & Ohio	12[3]	1,500	Freight	Electro-Motive
	2[3]	1,200	Yard switch	Electro-Motive
	29[3]	1,500	Road switch	Electro-Motive
Chicago, Burlington & Quincy	6[4]	2,250	Passenger	Electro-Motive
	17[4]	1,500	Road switch	Electro-Motive
	8[4]	1,500	Road switch	Electro-Motive
Great Northern	1A[5]	1,500	F-7	Electro-Motive
	1B[5]	1,500	F-7	Electro-Motive
New York, Chicago & St. Louis	10	1,500	Road switch	Electro-Motive
	10	1,000	Yard switch	Alco-G.E.
	5	1,200	Yard switch	Fairbanks, Morse
International Harvester Co.	4[6]	800	Switch	Electro-Motive
	2[6]	1,200	Switch	Electro-Motive
St. Louis-Southwestern	8	1,600[7]	Road switch	Alco-G.E.
	4A	1,500[7]	Freight	Electro-Motive
Seaboard Air Line	5A	2,250[8]	Passenger	Electro-Motive
	25	1,500[8]	Road switch	Electro-Motive
	10	1,600[8]	Road switch	Alco-G.E.
	10	1,000[8]	Yard switch	Alco-G.E.
	10	1,200[8]	Switch	Baldwin-Lima-Hamilton

FREIGHT-CAR ORDERS

Road	*No. of cars*	*Type of car*	*Builder*
Apalachicola Northern	100[9]	Pulpwood	Pullman-Standard
Bangor & Aroostook	250	Insulated refrigerators	Pacific Car & Fdry.
	250	Insulated box	Pacific Car & Fdry.
Gulf, Mobile & Ohio	50[10]	70-ton covered hopper	Pullman-Standard
Minneapolis, St. Paul & Sault Ste. Marie	400[11]	50-ton box	Company shops
Toronto, Hamilton & Buffalo	300[12]	50-ton box	National Steel Car
Transportation Corps	204	80-ton flat	Pressed Steel
	386	40-ton tank	American Car & Fdry.

[1] Deliveries of A and B 1,500 units now being made. Delivery of three 1,500 road switchers expected in September. Delivery of remaining units expected during August.

[2] Delivery expected during August. Approximate cost, $2,300,000.

[3] Delivery of the 12 1,500 freight units scheduled for November. These will be made up into four locomotives costing $503,600 each. Delivery of the yard switchers scheduled for January. To cost $105,900 each Eighteen of the road switchers scheduled for delivery in January and 11 in February. Twenty-four will cost $162,665 each; three, $153,325 each, and the remaining two, $152,460 each.

[4] Delivery expected late this year.

[5] These two units will comprise one locomotive. Delivery expected late in August. Approximate cost, $335,000.

[6] Chicago, West Pullman & Southern, an International Harvester subsidiary, has requested I.C.C. authority to lease the six units from its parent company.

[7] Seven of the 1,600 hp. units are for freight service; the eighth, for passenger service. Delivery expected in October. The A units are scheduled for September delivery.

[8] Delivery of the A passenger units expected in December and of the 25 road switchers, during the fall. Five of the 1,600-hp. road switching units are to be equipped for passenger service. Delivery of the 10 road switchers and the 10 yard switchers expected during the fall and through January 1953. Delivery of the 10 1,200 switchers expected during the last quarter of 1952.

[9] Delivery expected early in 1953. Approximate cost, $750,000.

[10] Delivery scheduled for the first quarter of 1953.

[11] Estimated cost, $2,340,000. Delivery scheduled for late next year.

[12] Approximate cost, $2,300,000. Delivery scheduled for April 1953

ESSO COBLAX

"Tailor-made" to railroad specifications

The Sign of QUALITY — ESSO — The Symbol of SERVICE

RAILROAD PRODUCTS

SOLD IN: Maine, N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Penna., Del., Md., D. C., Va., W. Va., N. C., S. C., Tenn., Ark., La.

ESSO STANDARD OIL COMPANY — Boston, Mass. — New York, N. Y. — Elizabeth, N. J. — Philadelphia, Pa. — Baltimore, Md. — Richmond, Va. — Charleston, W. Va. — Charlotte, N. C. — Columbia, S. C. — Memphis, Tenn. — New Orleans, La.

ESSO COBLAX LUBRICANTS

have been specifically developed to provide highly dependable gear lubrication for traction motor drives on electric and diesel-electric locomotives; gas electric and multiple-unit cars; and many other locomotive and car lubrication requirements. Esso COBLAX is available in a wide range from fluid oils to semi-solid products... "tailor-made" for railroad applications.

BACKED BY CONSTANT RESEARCH

— keeping pace with latest engine design and developments. Esso Railroad Products are constantly being tested and improved.

BACKED BY CONSTANT FOLLOW-UP

— on-the-job check ups by Esso Sales Engineers assure dependable performance of Esso Railroad fuels and lubricants! Be sure to call on ESSO for any fuel or lubricating problem.

SUMMARY OF MONTHLY HOT BOX REPORTS

Month	Foreign and system freight car mileage (total)	Cars set off between division terminals account hot boxes			Miles per hot box car set off between division terminals
		System	Foreign	Total	
July, 1950	2,745,932,894	.....	.....	23,957	114,619
August, 1950	2,937,455,020	7,422	15,490	22,912	128,206
September, 1950	2,974,297,739	6,541	12,881	19,422	153,141
October, 1950	3,165,997,915	4,343	8,935	13,278	238,439
November, 1950	2,868,871,913	2,536	5,331	7,867	364,672
December, 1950	2,813,042,212	2,278	5,968	8,246	341,140
January, 1951	2,840,847,511	2,870	8,436	11,306	251,269
February, 1951	2,425,226,454	4,528	14,063	18,591	130,452
March, 1951	3,063,173,942	3,667	10,078	13,745	222,857
April, 1951	2,996,562,763	3,702	8,914	12,616	237,521
May, 1951	3,013,634,782	5,631	13,737	19,368	155,599
June, 1951	2,874,873,495	7,074	15,376	22,450	128,057
July, 1951	2,768,920,095	8,886	18,823	27,709	99,929
August, 1951	3,009,371,111	9,023	19,092	28,115	107,038
September, 1951	2,925,570,545	6,472	13,565	20,037	146,008
October, 1951	3,116,490,095	4,131	9,053	13,184	236,384
November, 1951	2,939,503,144	2,022	4,405	6,427	457,368
December, 1951	2,752,316,133	2,130	5,398	7,528	365,611
January, 1952	2,824,298,630	3,208	7,197	10,405	271,437
February, 1952	2'809,162,671	6,473	6,473	9,196	305,477
March, 1952	2,943,812,727	2,594	5,877	8,471	347,517

(chairman), general supervisor diesel engines, Atchison, Topeka & Santa Fe.

Committee Report—Possibilities of Diesel Parts Reclamation, F. Thomas (chairman), assistant to general superintendent equipment—diesel and electric, New York Central System.

TUESDAY, SEPTEMBER 16

9 A.M.

Committee Report — Standardization, Control and Distribution of Tools for Diesel Work—F. E. Molloy (chairman), superintendent motive power, Southern Pacific.

12 P.M.

Presidents' Luncheon—Speaker—J. P. Kiley, president, Chicago, Milwaukee, St. Paul & Pacific.

WEDNESDAY, SEPTEMBER 17

9 A.M.

Committee Report—Diesel Locomotive Cleaning; Improving Productivity of Steam Locomotives—C. H. Spence (chairman), superintendent shops, Baltimore & Ohio.

Committee Report—Determination of Diesel Facilities—H. E. Niksch (chairman), superintendent motive power and equipment, Elgin, Joliet & Eastern.

2:15 P.M.

Committee Report—Wheel Slip Detection—F. Thomas (chairman), assistant to general superintendent equipment—diesel and electric, New York Central System.

Team Work—A Safety Essential, by E. H. Davidson, director, Bureau of Locomotive Inspection, I.C.C.

Committee Report—Flashovers, Cause and Prevention—W. P. Miller (chairman), assistant to chief mechanical officer, Chicago & North Western.

Railway Fuel and Traveling Engineers' Association

MONDAY, SEPTEMBER 15

10 A.M.

Address—President R. H. Francis.

Secretary's report.

Water Treatment—Steam and Diesel Locomotives, G. E. Anderson (chairman), general fuel supervisor, Great Northern.

Improvement and Efficiency in the Use of Coal for Steam Locomotives, C. R. Patterson (chairman), fuel supervisor, Canadian National.

Excitation System Alco-G.E. Diesel Locomotives (with slides), R. D. Nicholson (chairman), general road foreman engines, New York, New Haven & Hartford.

2 P.M.

Passenger-Train Handling; Freight-Train Handling; Dynamic Braking, T. H. Bickerstaff (chairman), supervisor air brakes, Atchison, Topeka & Santa Fe. (Joint session with Air Brake Association.)

TUESDAY, SEPTEMBER 16

9 A.M.

Definition of Specifications for Diesel Fuel Oil, T. L. Henley (chairman), chief fuel supervisor, Missouri-Kansas-Texas.

Use of Diesel Fuel Oil and Loss of Fuel, T. L. Henley (chairman), chief fuel supervisor, Missouri-Kansas-Texas.

Steam Generators — Trouble Shooting, etc., W. H. Fortney (chairman), chief road foreman engines, Cleveland, Cincinnati, Chicago & St. Louis.

Safety on Railroads and Proper Observance of Signals, by H. P. Hamilton, St. Louis-San Francisco.

Diesel Operation, Including Improper Handling of Locomotives, R. R. Rich (chairman), road foreman of equipment, Chicago, Rock Island & Pacific.

Train Delays Caused by Diesel Failures—Cause and Remedies, T. J. Conway (chairman), fuel supervisor, Texas & Pacific.

Employee and Public Relations, by L. C. Porter, vice-president (operating), Texas & Pacific.

WEDNESDAY, SEPTEMBER 17

9 A.M.

Safety Precautions on Diesel Locomotives, R. D. Nicholson (chairman), general road foreman engines, New York, New Haven & Hartford.

Importance of Making Proper Reports, etc., by Edward H. Davidson, director, Bureau of Locomotive Inspection, I.C.C.

Tracing Schematic Wiring Diagrams of EM Model F-7, E-8, GP-7 Diesel-Electric Locomotives (with slides), F. G. LaMaster (chairman), system fuel supervisor, Chicago, Burlington & Quincy.

Prevention of Loss and Damage and Personal Injuries Due to Rough Handling, G. B. Curtis (chairman), road foreman of engines, Richmond, Fredericksburg & Potomac.

2 P.M.

Results of Election.

Air Pollution and Smoke Abatement, M. G. Stewart (chairman), road foreman of engines, Washington Terminal Co.

Education of Road Supervision and Engine Crews, R. H. Francis (chairman), general road foreman equipment, St. Louis-San Francisco.

Car Department Officers' Association

MONDAY, SEPTEMBER 15

10 A.M.

Address—President W. N. Messimer, general superintendent equipment, Merchants Despatch Transportation Corporation.

Address by A. E. Wright, president and general manager, Manufacturers Railway and St. Louis Refrigerator Car Company.

Report of Committee on Interchange and Billing for Car Repairs, J. J. Sheehan (chairman), supervisor car repair bills, Missouri Pacific.

2 P.M.

Report of Committee on Air-Conditioning Equipment—Operations and Maintenance, R. F. Dougherty (chairman), general electrical and air conditioning inspector, Union Pacific.

Report of Committee on A.A.R. Loading Rules, A. C. Bender (chairman), joint supervisor car inspection, Cleveland Car Inspection Association.

TUESDAY, SEPTEMBER 16

9 A.M.

Report of Committee on Inspection, Conditioning and Repairing Cars for Higher Commodity Classification, T. E. Hart, chief car inspector, New York, Chicago & St. Louis.

Comments by C. A. Naffziger, director, National Freight Loss and Damage Prevention Section, Association of American Railroads.

Report of Committee on Car Lubrication, K. H. Carpenter, superintendent car department, Delaware, Lackawanna & Western.

Comments by W. M. Keller, director mechanical research, Association of American Railroads.

WEDNESDAY, SEPTEMBER 17

9 A.M.

Report of Committee on Analysis of Train Yard Operation, W. B. Medill, master car repairer, Southern Pacific.

Report of Committee on Wheel-Shop Practices, E. W. Kline, general wheel shop foreman, Baltimore & Ohio.

Report of Committee on Painting—Some Aspects of Railway Equipment Maintenance, F. M. Vogel, painter formean, Denver & Rio Grande Western.

Miscellaneous reports.

Election of officers.

USE ANHYDREX

Water in some form or other causes more interference with satisfactory cable service than any other one thing. Even small amounts of moisture finding their way into cables can put important power circuits out of business.

Cables in ducts are nearly always exposed to water. Even aerial cables can suffer from water. That is why you should use ANHYDREX cables to keep your amperes dry. With Simplex Anhydrex rubber insulation you need not use a lead sheath. ANHYDREX cables will function satisfactorily even under the wettest conditions.

You can avoid cable troubles on your important feeder circuits by using Simplex Anhydrex insulation on your cables. In that way you assure yourself that your amperes will always be dry. If you would like to know more about this dependable, long-lived insulation, simply send a request to the address below.

SIMPLEX ANHYDREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

Electrical Section of the Engineering and Mechanical Divisions, A.A.R.

MONDAY, SEPTEMBER 15

10 A.M.

Address by H. F. Finnemore (chairman, Electrical Section), chief electrical engineer, Canadian National.

Business session.

Election of officers.

Discussion committee reports on: Wire, Cable and Insulating Materials, C. R. Troop (chairman), assistant engineer, New York Central System.

Electrolysis, H. P. Wright (chairman), assistant electrical engineer, Baltimore & Ohio.

Application of Corrosion-Resisting Materials to Railway Electrical Construction, S. R. Negley (chairman), electrical engineer, Reading.

Power Supply, C. P. Trueax (chairman), assistant electrical engineer, Illinois Central.

2 P.M.

Special reports on New Orleans Union Passenger Terminal, by C. J. Wallace, manager, New Orleans Union Passenger Terminal, and J. M. Trissal, assistant chief engineer, Illinois Central.

Discussion committee reports on: Electric Heating, C. A. Williamson (chairman), electrical engineer, Texas & New Orleans.

Application of Radio and Communicating Systems to Rolling Stock, W. S. Heath (chairman), electrical assistant, Atchison, Topeka & Santa Fe.

TUESDAY, SEPTEMBER 16

9 A.M.

Business session.

Discussion committee reports on: Illumination, L. S. Billau (chairman), electrical engineer, Baltimore & Ohio.

Wiring Diagrams for Rolling Stock, E. J. Feasey (chairman), general supervisor of diesel equipment, Canadian National.

Car Electrical Equipment, S. B. Pennell (chairman), assistant engineer, New York Central System.

Welding and Cutting, L. E. Grant (chairman), engineer of tests, Chicago, Milwaukee, St. Paul & Pacific.

12 NOON

Joint luncheon with Railway Electric Supply Manufacturers' Association and Allied Railway Supply Association. Speaker, J. P. Kiley, president, Chicago, Milwaukee, St. Paul & Pacific.

WEDNESDAY, SEPTEMBER 17

9 A.M.

Discussion committee reports on: Car Air Conditioning Equipment, A. E. Voight (chairman), car-lighting and air-conditioning engineer, Atchison, Topeka & Santa Fe.

Electrical Facilities and Practices for Repair Shops.

1:45 P.M.

Committee on Automotive and Electric Rolling Stock, C. A. Wilson (chairman), general supervisor diesel engines, Atchison, Topeka & Santa Fe. (Joint session with Locomotive Maintenance Officers' Association.)

N.P.A. To Drop Unit Production Controls

Unit production controls governing output of freight cars and locomotives will be eliminated by the National Production Authority, effective with respect to materials allocated in this year's fourth quarter for production during the first quarter of 1953.

N.P.A. announced this at recent meetings of its advisory committees which represent the car and locomotive builders. At their previous meetings, the committees had recommended elimination of the unit controls which fix the number of cars and locomotives to be produced out of each quarter's allocations of controlled materials. The meetings of the committees were held during the week of June 28, at which time the N.P.A. also met with the advisory committee representing manufacturers of component parts. The Locomotive Builders' Industry Advisory Committee told the N.P.A. that "if the steel strike continues much longer, the nation's railroad equipment industry will be laid 'flat on its back' late in July or early in August." The Railroad Contract Car Builders' Industry Advisory Committee said that some shops have already been shut down and that others will be immobilized by the end of July. Trouble confronts the railroad Freight Car Component parts manufacturers' industry unless steel production is resumed very soon.

N.P.A. officials predicted that the elimination of unit controls would result in "greater flexibility" of car and locomotive production schedules. They emphasized, however, that allocations of material will continue to be made to the railroad industry as at present and that the end of unit control does not mean that any more material will be available.

Recommendations made at July 8 meetings of the Railroad Advisory Committee of the N.P.A. proposed that "available material for the construction of freight cars and locomotives be allocated in accordance with the condition of order boards." Railroad officers who constitute the committee members were of the opinion that N.P.A.'s practice of allocating material to companies without orders results in production of fewer units than if all available material were allocated against existing orders. The N.P.A. representatives at the meeting, however, were reported to have said that the proposed plan would require all orders to be booked about nine months in advance and might greatly injure some railroads and freight-car and locomotive builders.

Meanwhile, the railroad committee recommended that fourth quarter allotment tickets be issued under the Controlled Material Plan just as though no steel strike were in progress because they believe that such a plan will make it possible to obtain steel more quickly after the strike is settled. On the other hand, the N.P.A. representatives were of the opinion that the struck mills will need two weeks for rescheduling their orders before new orders can be accepted.

According to the American Iron and Steel Institute in its release of Monday, July 21, at the end of the second full week of July over 16,250,000 tons of steel will have been lost in the controversy with the steel workers, including the shutdowns in late April and early May as well as the eight-week interval which began on June 2.

FOR SALE

5 Baldwin built, type 4-8-2 high speed passenger and freight general purpose steam locomotives, ten years old, tractive effort 67,900 lbs., driving wheels 73" O.D., completely equipped with Timken roller bearings.

Contact —
H. M. Rainie
Vice President
Boston & Maine R.R.
Boston 14, Mass.

Boston and Maine R. R.

Advertisement

Miscellaneous Publications

SPRAY PAINTING MADE EASY. Published by DeVilbiss Company, 300 Phillips avenue, Toledo 1. Cost, 35 cents. Booklet includes short cuts and hints for spray-painting; job set-ups; sections on furniture, walls and woodwork spraying, and metal finishing, and a material guide covering various finishing materials used in the spray application. Special section gives quick data on 62 different types of spray jobs.

◆

I.C.S. INSTRUCTION TEXTS ON ELECTRICAL EQUIPMENT OF DIESELS.—International Correspondence Schools, Scranton, Pa. Two new instruction texts on the Electrical Equipment of Diesel Locomotives have been added to I.C.S. courses in Diesel Locomotives. The texts were written by Harold K. Lanning, mechanical research engineer of the Atchison, Topeka & Santa Fe, and are available both to individual students and to companies using the I.C.S. Selective Plan under which employers select only those subjects which are required to achieve a specific training objective for certain key personnel. Part 1 covers systems of power transmission, motor requirements, characteristics of traction motors, motor cooling and rating, current-voltage-speed relations, field shunting, dynamic braking, commutation, mechanical and electrical construction, and maintenance. Part 2 deals with factors influencing generator design, current range of generator and motor, power circuits, commutation and mechanical features of generators.

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT	RPM Delo R.R. Oil
UNIT	Locomotive diesel engines
SERVICE	Freight and passenger
OPERATION	Local and transcontinental
MAINTENANCE	Progressive

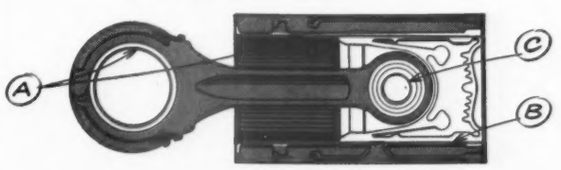
One million miles of service from engine parts!

LUBRICATED WITH RPM DELO R.R. OIL, many diesel engines in the locomotives of U.S. railroads have been in service for long periods without complete overhaul! Many of the liners, pistons, bushings and other parts in these engines have now been in use for hundreds of thousands of miles. Progressive maintenance inspections indicate that RPM DELO R.R. Oil will keep the parts in service for at least one million miles, the general overhaul period set by some of the railroads.

RPM DELO R.R. Oil keeps parts clean and free of wear-causing lacquer and gum deposits and is not corrosive to engine metals of any kind.

IN OVERLAND MOUNTAINOUS FREIGHT SERVICE for nearly 500,000 miles, this liner, lubricated with RPM DELO R.R. Oil has less than 0.006 inch wear and taper is so minor that it is barely measurable.

How RPM DELO R.R. Oil prevents wear, corrosion, oxidation



A. Special additive provides metal-adhesion qualities...keeps oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean...helps prevent scuffing of cylinder walls.

C. Special compounds stop corrosion of any bushing or bearing metals and foaming in crankcase.

THIS PISTON AND CONNECTING ROD have been in service for more than four years. After picture was taken it was put back in the engine for further use. Note the excellent condition of the rings and bearing. All the rings are free, oil holes open and there are no troublesome deposits in any ring grooves.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any one of the companies listed below.

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA
225 Bush Street • San Francisco 20, California

THE CALIFORNIA COMPANY
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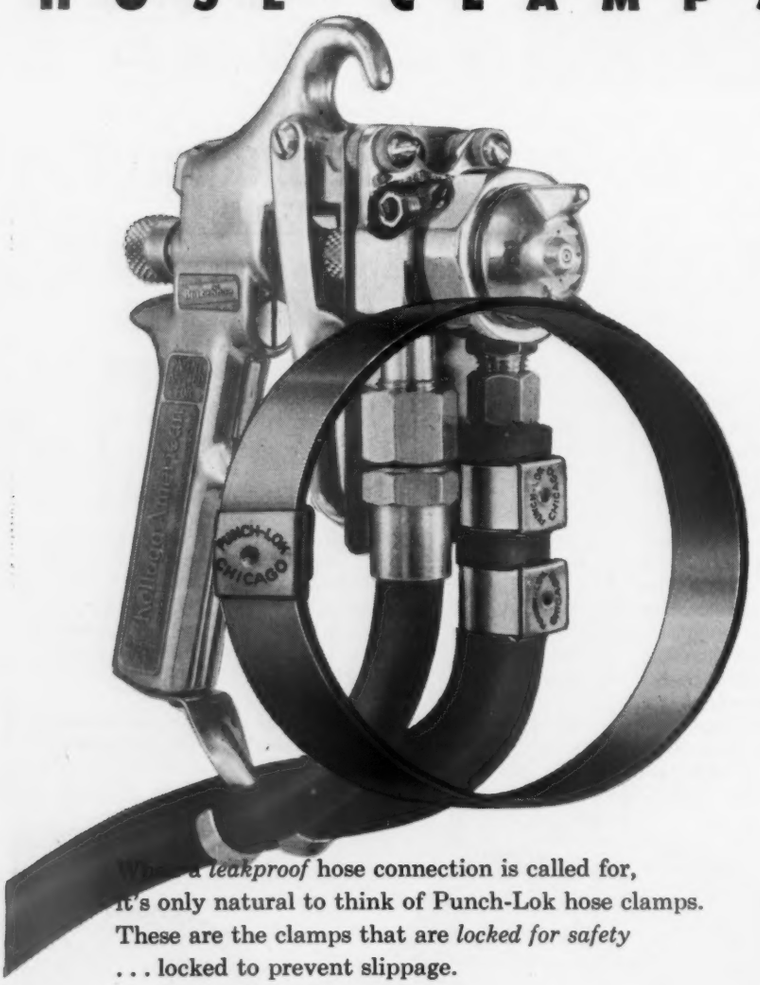
STANDARD OIL COMPANY OF TEXAS
P.O. Box 862 • El Paso, Texas

naturally, AMERICAN Brake Shoe COMPANY chooses

PUNCH-LOK

HOSE CLAMPS



When a *leakproof* hose connection is called for, it's only natural to think of Punch-Lok hose clamps. These are the clamps that are *locked for safety* . . . locked to prevent slippage.

That is why the Kellogg Division of the American Brake Shoe Company chooses Punch-Lok hose clamps for its Kellogg-American steam spray guns.

In addition to applications such as this . . . Punch-Lok hose clamps are also used extensively for leakproof connections on air, water, and steam hose.

"The Sign of a Good Hose Clamp"

Punch-Lok COMPANY

321 North Justine Street • Chicago 7, Illinois

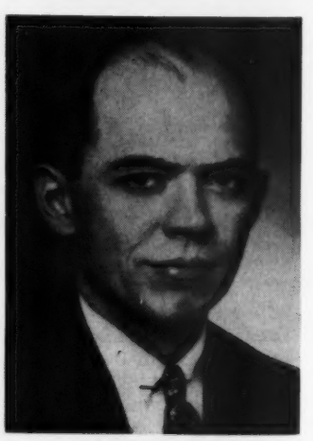
SUPPLY TRADE NOTES

PENNSYLVANIA SALT MANUFACTURING COMPANY.—*John E. Hawley* has joined the Research and Development Division of Pennsalt at the Whitemarsh Research Laboratories, Wyndmoor, Pa. Mr. Hawley's duties in the Maintenance Chemicals Department will involve the development of cleaning compounds for the transportation industry. Mr. Hawley was previously on the engineer of tests staff of the Baltimore & Ohio.

J. E. Hawley

◆

AMERICAN CAR & FOUNDRY CO.—*Robert G. Brossard* has been appointed sales agent in the New York District office of American Car & Foundry. Mr. Brossard, who was formerly located in Cleveland, will report to Thomas C. Ballou, district sales manager.



R. G. Brossard

Mr. Brossard is a graduate of Washington University, St. Louis (1936) with an AB degree. He joined ACF's Cleveland sales office in 1944, handling railroad and miscellaneous sales.

◆

UNITED STATES STEEL CORPORATION.—*Keith P. Rindfleisch*, Chicago district manager of the United States Steel Supply di-

Go easy on the Commutator

with

NATIONAL

TRADE-MARK

Carbon Brushes

for Diesel-Electric

Main Generators

There are far more "National" Carbon Brushes on Diesel-Electric locomotive main generators than *all other makes combined!*

Behind this overwhelming preference for "National" Main Generator brushes is their proved ability to *produce* and *maintain* perfect commutator surface under all *ordinary* operating conditions . . . and to *minimize* commutator wear, bar-burning and copper-dragging under the most *difficult* conditions.

Give costly generator maintenance the brush-off with "National" brushes . . . specifically designed for maximum commutator mileage and efficiency, while combining superior mechanical and electrical properties to assure lasting and dependable brush service.

LOW LIGHT BILLS...

...mark phenomenal acceptance of "EVEREADY" No. 1050 Industrial Flashlight Batteries by a broad cross-section of industry. Delivering twice the usable light of any battery we've ever made before, it will not swell, stick, or jam in the flashlight... has no metal can to leak or corrode.

WRITE FOR BULLETIN CP-2426—"NATIONAL" STANDARDIZED BRUSHES

BUY NATIONAL *STANDARDIZED* BRUSHES FOR MOST EFFICIENT MOTOR AND GENERATOR OPERATION.

The terms "National", "Eveready", the Three Pyramids device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.
District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: National Carbon Limited, Montreal, Toronto, Winnipeg

vision of U. S. Steel, has been appointed sales vice-president. *H. P. Kibbey*, assistant district manager at Chicago, succeeds Mr. Rindfleisch.

◆

UNION ASBESTOS & RUBBER CO.—*Robert M. Covert* has been appointed eastern district sales manager—railroad sales, for the Union Asbestos & Rubber Co., with headquarters in New York. Mr. Covert is the former district sales manager at Chicago, where he covered Chicago and the north midwest.

◆

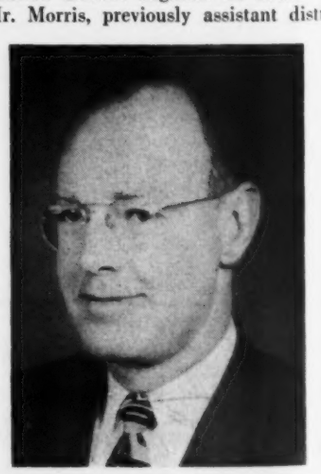
WESTINGHOUSE AIR BRAKE COMPANY.—The following appointments have been made in the Air Brake Division of the company: At New York—*C. O. DeWitt*, assistant manager of the eastern district, and *R. B. Morris*, eastern district engineer. At Chicago—*J. G. Rees*, representative, western district, and *D. G. Blaine*, representative.

Mr. DeWitt, a graduate of Case School of Applied Science, has been with the company since 1926, serving on the engi-

C. O. DeWitt

neering staff at Wilmerding until his transfer to the New York Office in 1930 as assistant to the district engineer. He was appointed district engineer in 1941.

Mr. Morris, previously assistant district



R. B. Morris

engineer, has served on the eastern district engineering staff since 1941 when he was

assigned to Philadelphia as engineer. He is a graduate of Pennsylvania State College. He joined Westinghouse Air Brake immediately after graduation in 1937, serving on the engineering staff in Wilmerding.

Mr. Rees became associated with Westinghouse Air Brake upon graduating from Cornell University in 1946. He worked in

J. G. Rees

the Wilmerding engineering department before assignment to Chicago, where he has been service engineer since February, 1948

Mr. Blaine, a graduate of Purdue University, joined the engineering staff at

D. G. Blaine

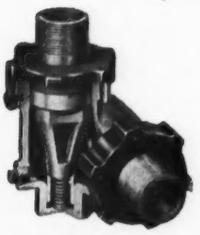
Wilmerding in 1941. He served in the commercial engineering division at the home office and moved to Chicago in 1947 as service engineer.

◆

GENERAL MOTORS CORPORATION.—*Milton H. Gardner,* general repair sales manager, has been appointed assistant general sales manager of the *Electro-Motive Division* of General Motors. *G. C. Mikelson,* a sales engineer, has been appointed sales representative in the Chicago Region.

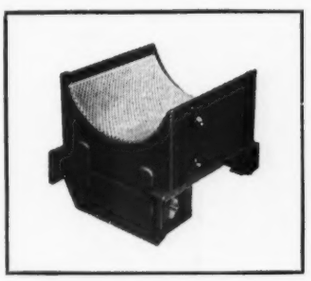
Mr. Gardner, whose promotion follows consolidation of the commercial selling activities within the sales department with rebuilding of locomotive components being joined with new locomotive sales activities, has been with Electro-Motive since February 1938 when he became associated with the organization as a service engineer. Prior to joining Electro-Motive he had 10 years' service with the Chicago, Burlington

use Franklin parts on Franklin devices

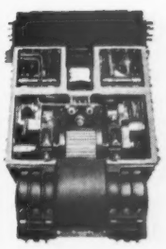


Sleeve Joints

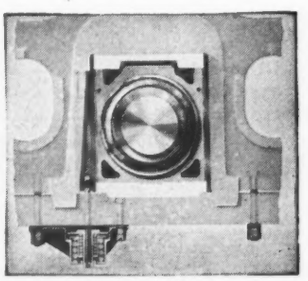
In order to obtain full efficiency from your Franklin devices, specify genuine Franklin parts in replacement. Franklin devices will always perform best when equipped with genuine Franklin parts made to interchangeable tolerances and of the correct materials.



Driving Box Lubricators



The Locomotive Booster

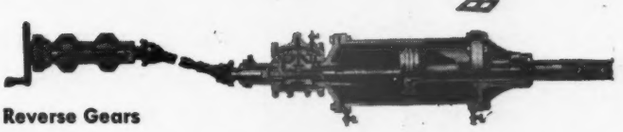


Automatic Compensators & Snubbers

Franklin System of Steam Distribution

Radial Buffers

Fire Doors



Power Reverse Gears

FRANKLIN RAILWAY SUPPLY COMPANY

A CORPORATION

NEW YORK • CHICAGO • TULSA • MONTREAL

STEAM DISTRIBUTION SYSTEM • BOOSTER • RADIAL BUFFER • COMPENSATOR AND SNUBBER
POWER REVERSE GEARS • FIRE DOORS • DRIVING BOX LUBRICATORS
JOURNAL BOXES • FLEXIBLE JOINTS

EXCLUSIVE RAILWAY DISTRIBUTORS FOR: N.A. STRAND FLEXIBLE SHAFT EQUIPMENT
IRVINGTON ELECTRICAL INSULATION AND VARNISH

"Buffalo" Tips on Better DRILLING

RIGID CONSTRUCTION MEANS

• Greater Accuracy • Lower Drill Breakage

The less vibration transmitted through the drill spindles, the greater the accuracy in drilling, reaming, and tapping. The large 97"-high "Buffalo" No. 22 Drill at right is a good example of rigid, precision construction which facilitates accuracy. Its 5.5" column, its 17" x 22" working table and its base are heavy and rigid. Its 1.312" diameter 6-spline spindle is of high carbon alloy steel, heat-treated and ground. It runs in bronze bushings in the feed rack sleeve which is provided with ball thrust bearings top and bottom with end play adjustment. These and other features make "Buffalo" Drills lastingly accurate as well as easy and profitable to operate.

Above, the "Buffalo" No. 22 Pedestal Drill, ideal for heavy work up to 2" capacity in cast iron, in railway shops, other heavy industries.
WRITE FOR BULLETIN 2989-F.

Left, another example of "Buffalo" accuracy and speed in tool room and production drilling — the "RPMster". Just by moving a lever, the operator can change speeds instantly while motor is running. 99" high. 1½" capacity.
WRITE FOR BULLETIN 3257.

75th DIAMOND JUBILEE ANNIVERSARY

"Buffalo" MACHINE TOOLS

BUFFALO FORGE COMPANY

174 MORTIMER ST BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING · PUNCHING · SHEARING · CUTTING · BENDING

& Quincy, much of it in gas-electric rail car and diesel locomotive maintenance and operation. After holding various positions in the service department of Electro-Motive, Mr. Gardner became St. Louis regional service manager on July 1, 1946. In April

M. H. Gardner

1948 he was appointed district sales manager, St. Louis region; a year later, general repair manager at La Grange, and early in 1951 general repair sales manager.

Mr. Mikelson became associated with Electro-Motive on January 4, 1939. He became a personnel instructor in the service department in May 1943, and a senior in-

G. C. Mikelson

structor in the same department three years later. On April 1, 1949, Mr. Mikelson was appointed a service engineer; on October 1, 1950, district engineer, and on February 16, 1951, sales engineer.

◆

SPRING PACKING CORPORATION. — A graphic demonstration of how moisture condensation inside railroad box cars may be safely controlled with no damage to lading provides the main theme for a 15-min. color film "The Story of Dednox," recently released by the Spring Packing Corporation. The film, written and produced by the Telepix Corporation, Hollywood, is an actual scene-by-scene dramatization of a typical railroad claims-loss cause due to moisture condensation during shipment. Condensation causes, effects, and preventive measures through spraying of Dednox are visually explained. Animated treatments point up highlights of the theme. Koda-

HOW TO MAKE CAR LIGHTING BATTERIES PAY HIS WAGES

Follow this system and the money you'll save will practically pay a battery man's wages. First, use Gould Car Lighting and Air Conditioning Batteries. They're rugged, dependable, give full power, longer. Second, extend the service life of *all* your lead-acid batteries, regardless of make, as much as 50% with the Gould Plus-Performance Plan. This complete system of technical help is free to all battery users without obligation. Write Gould Battery Information Headquarters for full details.

Gould "Z" Plate Batteries for Air Conditioning and Car Lighting

GOULD *Industrial Batteries*

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

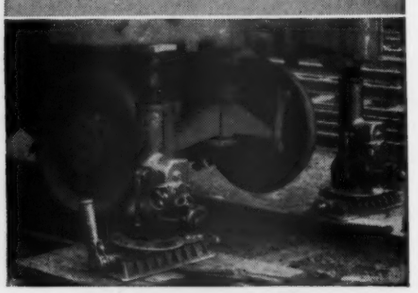
Always Use Gould-National Automobile and Truck Batteries

FOR QUICK—ECONOMICAL

RERAILING of LOCOMOTIVES and RAILROAD CARS

DUFF-NORTON *TRAVERSING BASES*

Emergency rerailing of Diesel, steam, electric locomotives and railroad cars . . . is safe, simple and low in cost, with Duff-Norton Traversing Bases. Carried on wreck trains in units of two bases and two jacks, they eliminate the need for expensive cranes and are always available for any rerailing job.



Traversing Bases and Jacks are placed under load, for rerailing locomotives and cars.

QUICK DATA ON TRAVERSING BASES

Jack No.	Capacity Tons	Height Inches	Horizontal Travel Inches	Weight Pounds	Size of Plate Inches
39-TB	35	3¾	15	85	12 dia.
*40-TB	50	4	15	106	10 x 12
41-TB	50-75	4	20	140	14 dia.

*No. 40-TB can also be furnished for 26" horizontal movement on special order.

No. 40-TB furnished with wooden operating lever 1⅛" x 24" long.

Nos. 39-TB and 41-TB supplied with steel operating lever 1" x 24" long.

Freight car is lifted and moved horizontally until wheels are aligned with rails. Jacks are lowered to complete rerailing job.

For Jacks Used With Traversing Bases . . .
Write for Your Copy of Bulletin AD-4-R.

DUFF-NORTON JACKS — STRENGTH, SAFETY, DURABILITY — ESTABLISHED 1883

THE DUFF-NORTON MANUFACTURING CO.

Main Plant and General Offices, PITTSBURGH 30, PA. Canadian Plant, TORONTO 6, ONT.

"The House that Jacks Built"

chrome prints in 16 mm are available to railroad groups on a free-loan basis by writing George L. Green, Spring Packing Corporation, 332 South Michigan avenue, Chicago 4.

◆

AIR-MAZE CORPORATION.—*Richard E. Brown* has been appointed chief engineer at Cleveland, Ohio.

Mr. Brown, a graduate of Case Institute

R. E. Brown

of Technology with a degree in mechanical engineering, has been with Air Maze during the past ten years as development engineer and more recently has been assistant chief engineer.

◆

NATIONAL ELECTRIC PRODUCTS CORPORATION.—*C. Wesley Merritt* has been appointed sales manager of the newly organized railroad department of the National

C. W. Merritt

Electric Products Corporation, Pittsburgh. Mr. Merritt will coordinate sales of wires, cables, conduits, raceways and accessories for installation in railroad rolling stock and diesel maintenance shops.

Mr. Merritt, graduate in electrical engineering of the University of Pittsburgh (1921), has been with National Electric since 1940. He has most recently been engineer of wires and cables.

◆

SHERWIN-WILLIAMS COMPANY.—*Arthur H. Burt* has been appointed director of sales for the Sherwin-Williams Company, with headquarters in Cleveland. Mr. Burt has spent his entire business career with Sherwin-Williams. In 1946 he was appointed director of the north central sales re-

gion, also with headquarters in Cleveland, in which capacity he was serving at the time of his new appointment.

◆

GENERAL STEEL CASTINGS CORPORATION.—*Howard F. Park, Jr.*, whose appointment as manager of sales for the General Steel Castings Corporation was announced in the July issue became associated with General Steel Castings in 1942, after several years with the Western Electric Company and the Budd Company. Mr. Park was in charge of the purchasing department until 1945, when he became assistant to vice-president—sales. Later he was appointed assistant district manager of the eastern sales office, and in 1950, district manager—sales.

Howard F. Park, Jr.

Lawrence P. White, whose appointment as district manager—sales, at the eastern district sales office, also was announced in the July issue, joined General Steel Castings in 1946 as a special apprentice and progressed through various departments of the company in a training program. He entered the sales department in 1947 and in 1950 became manager of foreign sales.

Lawrence P. White

◆

BOGUE ELECTRIC MANUFACTURING COMPANY.—*Macdonald Goodwin* has been appointed regional sales manager of the railway equipment division of the Bogue Electric Manufacturing Company, with headquarters at Washington, D. C. Mr. Goodwin will represent the firm to railroads in the southeast and middle Atlantic states.

C. Earl Healey has been appointed staff assistant to the president of the division and *Sylvain Garnett* has been appointed staff assistant to John A. Herbst, vice-president in charge of engineering for Bogue Electric. Mr. Healey and Mr. Herbst will maintain headquarters at the general offices in Paterson, N. J. *Clayton R. Kielich* has been appointed systems engineer in the engineering department at Paterson.

◆

JOSEPH T. RYERSON & SON.—*Weaver E. Falberg*, assistant manager of the alloy-steel division of Joseph T. Ryerson & Son, has been appointed manager of the division, to succeed *John W. Queen*, who has been given special administrative duties while awaiting re-assignment in the organization.

◆

MCDOUGALL-BUTLER COMPANY.—*Justin A. Shook* has been appointed to the McDougall-Butler sales staff for Washington, D. C. and vicinity.

◆

MOSEBACH ELECTRIC & SUPPLY CO.—The majority stock of the Mosebach Electric & Supply Co., Pittsburgh, has been acquired by *R. Hampton* and *L. H. Hampton*, concurrently with the resignation of *Mrs. Karl*

In the LONG RUN...
Truarc Retaining Rings
Resilient Stop Plates Prevent Axle Scoring
Easily Replaceable Unit Wick Set
Patented and Patents Pending
IT COSTS LESS TO LUBRICATE WITH MODERN
FELPAX Lubricators
Here's Why...
Maintenance reduced to a minimum of periodic checking and filling the oil sump.
Special Felt Wicks last thousands of miles without attention and eliminate waste grabs.
New, Improved Construction simplifies replacing worn out wicks. Inexpensive replacement kits make reconditioning of lubricators a fast, simple operation.
ON "HOT-SHOT" or "LOCAL"—you can be sure every journal is getting full continuous lubrication when modern FELPAX Lubricators are in each axle cap. Waste grabs and starved bearings due to improper packing of old fashioned yarn are eliminated. Special Felt Wicks in constant contact with the journal provide full, continuous lubrication from the first turn of the axle.
For Full Information about Modern FELPAX Lubricators see your locomotive builder or write to:
MILLER FELPAX CORPORATION
WINONA, MINNESOTA
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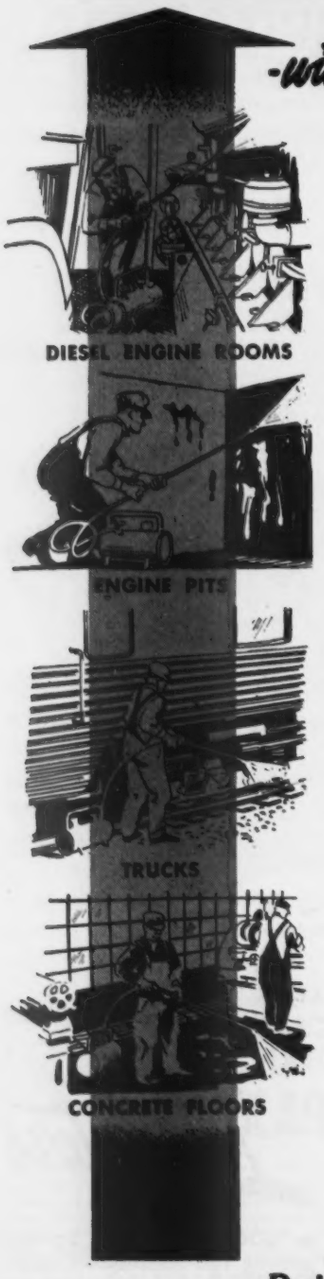
Oily, Greasy Surfaces Cleaned Quickly...Thoroughly

-without heat or harm to paint



One man, with a spraying unit and Diesel Magnusol, will do a better job in a fraction of the usual time, cleaning off the greasy dirt found on the surfaces of diesel engines... locomotive and coach trucks and underframes... engine pits and concrete floors all over your shops.

TAKE THE CLING OUT OF *grease and oil*

Diesel Magnusol is a concentrate... to be diluted with safety solvent for use. When you spray it, without heating, on any surface, it immediately penetrates deep into the dirt, no matter how greasy and oily it may be... and loosens the bond between the dirt and the surface being cleaned. After a short soaking period, dirt and cleaner are flushed away in the emulsion formed when the solution mixes with water. You get thoroughly clean surfaces, even in hard-to-reach areas where hand work is impossible.

SAFE FOR PAINT AND PERSONNEL

Diesel Magnusol cleaning solution is non-flammable, fumeless and non-toxic. It is harmless to paint and other surface coatings. It will save you plenty in cleaning costs wherever you use it. (You can save, for example, $10-$12 every time you use Diesel Magnusol for cleaning a diesel engine room.)

ORDER A TRIAL DRUM

If, after using Diesel Magnusol for 30 days according to our recommendations, you are not entirely satisfied, we will cancel the full invoice!

Railroad Division

MAGNUS CHEMICAL COMPANY • **77 South Ave., Garwood, N. J.**

In Canada—Magnus Chemicals, Ltd., Montreal

MAGNUS CLEANERS AND CLEANING EQUIPMENT

Representatives in all principal cities

J. Mosebach, co-founder of the firm, as treasurer and chairman of the board after 27 years of service. *R. Hampton*, president, has announced that the company is expanding the number of items manufactured for railroads, mines and mills. The new products will include various types of signal rail bonds, resistors and associated electrical items for railroads and overhead trolley systems.

◆

CAMEL SALES COMPANY.—*W. A. Beauchamp*, mechanical engineer for the Camel Sales Company, has been elected vice-president, engineering and research. *Gabriel Madland* succeeds Mr. Beauchamp as mechanical engineer.

◆

DAYTON RUBBER COMPANY.—*E. K. Lofton* has been appointed sales manager of the Dayton Rubber Company's railway and

E. K. Lofton

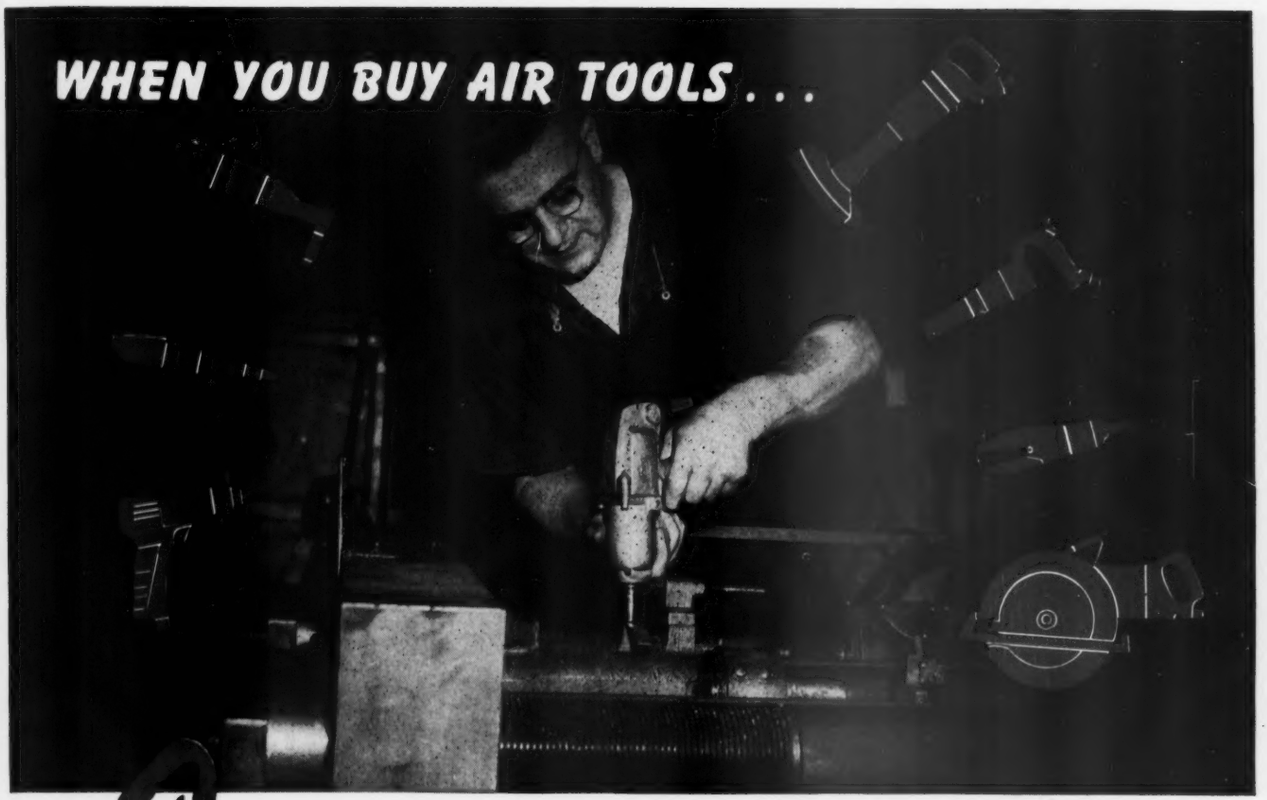
agricultural original equipment manufacturers', divisions. Mr. Lofton, who was formerly regional sales manager of the central region of the mechanical division, has been with the company since 1934. He will have headquarters in the company's main

E. F. Leherissey

plant, Dayton, Ohio, and will be assisted by *E. F. Leherissey* as manager of field sales of the railway division, with headquarters in the company's Chicago offices.

◆

GEORGIA-PACIFIC PLYWOOD COMPANY.—*Willis L. Campbell* has been appointed



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TOOL MAKERS SINCE 1893 Thor

Fifty-six years experience manufacturing MILLIONS of portable pneumatic tools qualifies Thor to render expert assistance on your air tool problems. Whether you need one or a hundred . . . drills, screwdrivers, nut setters, grinders, hammers, impact wrenches . . . Thor's COMPLETE LINE, Thor's world-wide service facilities can save you time and money in picking the right tool for the job. INDEPENDENT PNEUMATIC TOOL CO., AURORA, ILL., U.S.A.

AT YOUR SERVICE! A phone call to the Thor branch office in your city or a note to Thor headquarters in Aurora, Ill., will bring an Air Tool Expert to demonstrate or put on free trial any tool in the Thor line.

Thor TOOLS

ELECTRIC • PNEUMATIC

THIS MONTH

. . . Your Industrial Distributor is Featuring

WILLIAMS IMPACT "SUPERSOCKETS"®

WHY? First, the impact method has proved to be a real, modern cost and time saver. Second, Williams Impact "Supersockets"® give you unmatched value. Made of extra tough, specially heat-treated alloy steel, they stand up for that *extra* time that means more production at less cost. Then, too, they can be used with all types of power wrenches and nut runners... available in 7 square drive sizes... over 300 sockets and accessories. What's more, they also can be used with Williams hand socket drivers.

Want to know more—drop us a line and we'll gladly oblige with detailed information. Or ask your distributor... he knows.

J. H. WILLIAMS & CO., 427 Vulcan St., Buffalo 7, N. Y.

Williams Impact "Supersockets"® are sold through your Distributor who knows and can supply your needs promptly — correctly.

vice-president and assistant to the president of the Georgia-Pacific Plywood Company. Mr. Campbell formerly was vice-president and treasurer of the General Insurance Company of America at Seattle.

◆

YOUNGSTOWN SHEET & TUBE CO.—*David W. Martin* has been appointed district sales manager, in charge of the Atlanta, Ga., office.

Obituary

DONALD R. ROYAL, special representative of the railway service division of Oakite Products, Inc., at Atlanta, Ga., died recently in Memphis, Tenn. Before joining the Oakite organization in 1948 Mr. Royal was general foreman of the locomotive department of the Illinois Central at Centralia, Ill.

◆

WILLIAM WALTON FORD, district sales manager for the Youngstown Sheet & Tube Co. at Atlanta, Ga., for the past 24 years, died on June 11, in an Atlanta hospital.

Personal Mention

Atlantic Coast Line

G. R. GIBBS appointed general diesel supervisor, with headquarters at Jacksonville, Fla.

H. G. SWANSON appointed roundhouse foreman at Rocky Mount, N. C.

W. S. FUNDERBURG appointed assistant enginehouse foreman at Rocky Mount, N. C.

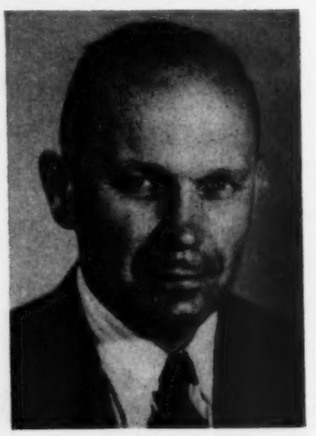
Canadian National

J. D. SYLVESTER, assistant electrical engineer, appointed electrical engineer at Montreal.

Born: Star, Alta.

Education: University of Alberta (B.S. in E.E., 1938).

Career: Became an engineering draftsman for the CNR at Montreal in 1939, and in 1942 was appointed assistant electrical engineer.



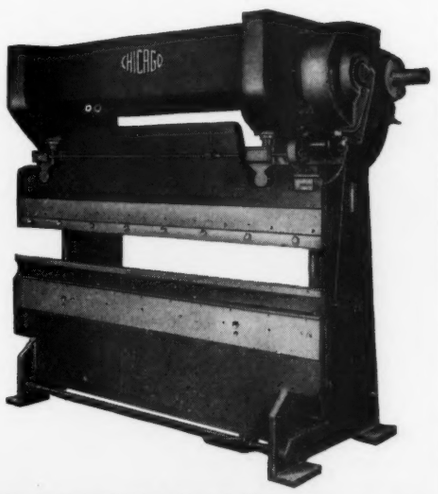
J. D. Sylvester

STEEL

CHICAGO PRESS BRAKES

Readily adapted for a wide variety of bending, forming, drawing, notching, blanking, punching, etc.

Complete Line of DIES for All Makes and Sizes of PRESS BRAKES



DREIS & KRUMP MANUFACTURING COMPANY
7414 S. Loomis Blvd., Chicago 36, Ill.

CHICAGO STEEL BENDING BRAKES BOX and PAN BRAKES PRESS BRAKES

Sweeney PORTABLE

MODEL 1100

TACHOMETER TESTER

ACCURATELY TESTS ALL MAKES OF PORTABLE TACHOMETERS IN JUST A FEW SECONDS

TESTS at SEVEN SPEEDS
300, 500, 600, 720, 800, 1000, 1800 R.P.M.

JUST PLUG IT IN ON AC!
ACCURATE AS AN ELECTRIC CLOCK!

Precision-built by the makers of the famous Sweeney POWERENCH Tools

B. K. SWEENEY MFG. CO., Denver 17, Colo. 8 R5
Please send full information on your Portable Tachometer Tester

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Address_____

City_____ State_____

A Practical Evaluation of

Railroad Motive Power

By P. W. KIEFER

Chief Engineer, Motive Power and Rolling Stock, New York Central System

The first authoritative information in book form of the comparative advantages of standard types of railroad motive power—steam, Diesel-electric, and electric. Based upon the results of a study made by the New York Central System of comparative operating costs of all three types on main line divisions.

Contents

Foreword—Introduction—The Reciprocating-Type Steam Locomotive—Other Coal-Fired Steam Locomotives—The Gas-Turbine Locomotive — Electric Locomotives — Diesel-Electric Locomotives — Motive Power Potentialities—Conclusions.

1949. 66 pages, illus., tables, charts, 5½x8¾, cloth, $2.50.

★

The Steam Locomotive

By RALPH P. JOHNSON

Chief Engineer, The Baldwin Locomotive Works

An authoritative treatise on the theory, operation and economics of the steam locomotive which includes comparisons with Diesel-electric locomotives. The subject matter is stripped down to fundamentals. Enough background is included to indicate paths of development.

1944. 2nd. 550 pages, 90 illus., 75 tables, 6x9, $6.50

★

Shop Hints on

Locomotive Valve Setting

By JACK BRITTON

In natural sequence and with the aid of simple drawings, without puzzling mathematical formula, the author, a former apprentice instructor, shows how to follow through on most any valve setting job. Covers Stephenson link motion, Walschaert, Baker, Young, and Joy valve gears, and the Gresley lever arrangement. Takes the mystery out of valve setting.

2nd. 350 pages, 210 illus., 5x8, $3.00.

★

4-6-4 Locomotive and Tender Chart

Shows 315 numbered parts including all the latest equipment on a Hudson type passenger locomotive. Scaled elevation and four cross-sectional drawings.

40x30 inches, folded to 9½x12, $.50

Simmons-Boardman Publishing Corporation RMGEE 8-52
30 Church Street, New York 7, N. Y.

Please send me on Ten Days' Free Examination the book(s) and/chart checked below. If not satisfactory I will mail them back postpaid. Otherwise I will remit their list price.

☐ Railroad Motive Power, $2.50 ☐ Steam Locomotive, $6.50
☐ Locomotive Valve Setting, $3 ☐ Locomotive and Tender Chart, $.50

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MICHIGAN CITY CAR BUILDER USES *NELWELD* IN TOP-EFFICIENCY PRODUCTION

Split-second application of Nelson studs on freight car end assembly. Special lightweight template jigs are used to accurately locate the studs.

The Michigan City plant of Pullman-Standard Car Mfg. Co. uses modern, proved methods and equipment to maintain its established policy of production efficiency. To secure furring strips and freight car component parts, the Nelweld method and Nelson granular flux-filled studs are used.

With the Nelweld method, workmen "take the tool to the job". The lightweight portable Nelweld gun quickly end-welds studs to car sections at the most advantageous stages in the production sequence. This results in:

- . . . **reduced handling of car ends.**
- . . . **faster installation of the required fasteners.**
- . . . **increased production and lower costs.**
- . . . **improved quality by eliminating holes in in the car ends and providing smooth, corrosion-free exteriors.**

Full technical information and Nelweld Engineering Service are available to show you how Nelweld advantages can bring cost-saving results to your fastening operations. Contact your nearest Nelson representative or Dept. R-4, Lorain, Ohio.

Fasten it Better...at Less Cost, with NELWELD

NELSON STUD WELDING

DIVISION OF GREGORY INDUSTRIES, INC., LORAIN, OHIO

P. H. BELL, mechanical superintendent for the Oshawa Railway Company, appointed mechanical and electrical superintendent, Niagara, St. Catharines & Toronto, with headquarters at St. Catharines, Ont.

W. E. DANTER, superintendent car equipment at Montreal, appointed assistant general superintendent of car equipment, with headquarters at Moncton, N. B.

A. D. MACPHERSON, controller of tests and materials research laboratory, has retired after 34 years of service.

J. J. MILLER, mechanical and electrical superintendent, Niagara, St. Catharines & Toronto, appointed electrical superintendent, St. Clair Tunnel, with headquarters at Port Huron, Mich.

H. J. BETTS, electrical engineer (equipment) at Montreal, appointed electrical engineer, central region, with headquarters at Toronto.

A. D. ROWE, locomotive foreman, St. John's, N.F., enginehouse, appointed general foreman in the locomotive shops at St. John's.

C. E. SKENE, road foreman of engines at Winnipeg, Man., appointed road foreman of engines, Port Arthur division.

F. HALDANE, road foreman of engines, Port Arthur division, appointed master mechanic, Edmonton division.

S. A. BEVERIDGE, assistant foreman, Toronto, Ont., enginehouse, appointed district boiler inspector, with headquarters at Toronto.

Chicago, Burlington & Quincy

F. R. HOSACK, general superintendent motive power at Chicago, appointed general superintendent car department.

F. J. SCHLEIHS, master mechanic at Des Moines, appointed general superintendent for motive power, with headquarters at Chicago.

Chesapeake & Ohio

F. E. LAWRENCE appointed road foreman of engines at Charlottesville, Va.

M. E. SANDRIDGE appointed assistant road foreman at Charlottesville, Va.

Chicago, Milwaukee, St. Paul & Pacific

F. A. UPTON, master mechanic at Western avenue, Chicago, appointed assistant superintendent of motive power, with headquarters at Milwaukee.

R. E. MAGNUSON, assistant master mechanic at Western avenue, Chicago, appointed master mechanic at Western avenue.

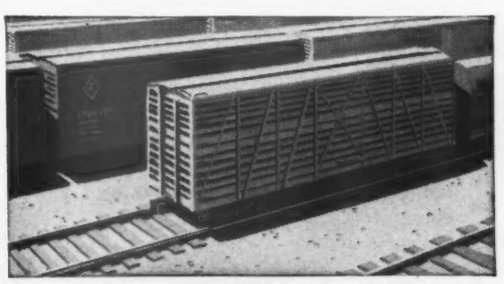
W. W. BATES, as master mechanic, has jurisdiction over the Milwaukee First and Third districts, with headquarters at Milwaukee.

F. L. KING, master mechanic at Milwaukee, has had jurisdiction extended to in-

"meet the public" on CLEAN, safe WOOD

protected with penta*

the clean wood preservative



Service life goes up; maintenance cost goes down!

PENTA protection can triple the effective life of car lumber – from flat car beds to stock car bodies.

Wherever wood structures and equipment meet the public, specify treatment with PENTA, the *clean* wood preservative. On PENTA-protected crossings and platforms, they walk on wood that's light and clean, neat appearing and safe. Stations and other wood structures, too, look better and last longer, for PENTA-protected wood can be painted when properly treated.

PENTA is more than surface protection—it penetrates deep into the wood to effectively resist decay and termites, make wood serve longer. These advantages are reflected in *reduced* material and labor costs for maintenance and repair, and *increased* operating efficiency. For complete information about PENTA and its application to your wood preserving problems, write Dept. PE 34.

THE DOW CHEMICAL COMPANY • *Midland, Michigan*

DOW CHEMICAL OF CANADA, LIMITED, TORONTO, CANADA

DOW

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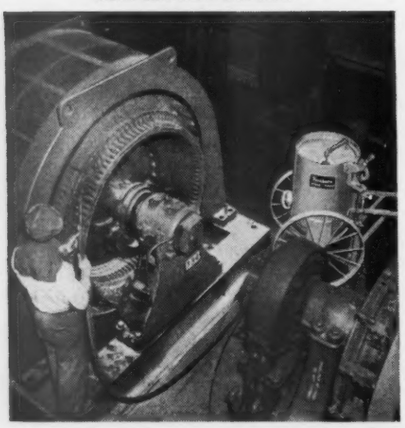
Pangborn SAVES

90.9% on materials 66.7% on labor in cleaning motors!

. . . reports user of Pangborn Corn Cob Blast Machine



Cleaning Duplicate 500 hp Synchronous Motors		
	Material	Labor
Solvent Method	$55.00	120 hrs.
PANGBORN Method	5.00	40 hrs.
SAVING	50.00 (90.9%)	80 hrs. (66.7%)

Remarks: With Solvent, drying period took an additional 8 hours.

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Soft, 20-mesh corncob grits do the job with 40-lb. air pressure, whisking away grease, oil, paint flakes, etc. FOR FULL INFORMATION on how the Pangborn AC-4 can help you, write us and tell us what you clean. Address: PANGBORN CORP., 3700 Pangborn Blvd., Hagerstown, Maryland.

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clude Second district of the Milwaukee Division and the First and Second districts of the Madison Division.

H. C. POTTSMITH appointed assistant master mechanic of La Crosse and River Division, with headquarters at La Crosse, Wis.

T. J. KUBAL appointed assistant master mechanic of the Madison Division First and Second districts, with headquarters at Milwaukee.

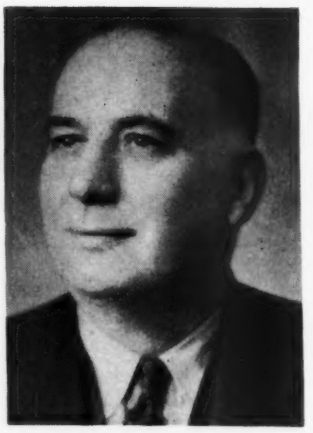
P. J. LUCAS appointed assistant to general road foreman of engines, with headquarters at Milwaukee.

Erie

CHARLES F. SCHWARTS appointed general master mechanic at Jersey City as announced in July issue.

Born: April 28, 1895, at Hornell, N. Y.

Career: Became machinist apprentice in Erie shops at Hornell, N. Y., on June 21, 1910. Subsequently served as a machinist at Hornell and Galion, Ohio; fitting shop foreman at Galion; foreman at Meadville; assistant general foreman at Hornell, and general foreman at Secaucus, N. J. Appointed master mechanic at Avoca, Pa., in March 1944; general foreman at Hornell in December 1945; master mechanic at Avoca in January 1946; shop superintendent at Hornell in September 1947, and master mechanic at Jersey City in April 1950.



Charles Frederick Schwartz

Missouri-Kansas-Texas

CLAY W. LEWIS, JR., chief chemist, test and inspection department, appointed engineer of tests at Parsons, Kan.

EARL V. SEIFERT, car and locomotive draftsman, appointed assistant engineer of tests (a newly created position).

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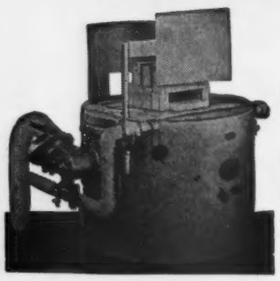

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New York Central

L. S. RANDOLPH appointed supervisor of locomotive performance, with headquarters at Buffalo.

H. J. SCHOLZ appointed road foreman of engines at Detroit.

KENNETH J. ICKES appointed assistant road foreman of engines at Jackson, Mich.

Norfolk & Western

J. L. BARRY, master mechanic, Scioto division, with headquarters at Portsmouth, Ohio, has retired.

H. B. ROBINSON, assistant master mechanic, Scioto division, appointed master mechanic of the division, with headquarters at Portsmouth, Ohio.

Northern Pacific

FRED O. YOUNG, mechanical engineer at St. Paul, has retired after 46 years of service.

H. E. BRAKKE, assistant to mechanical engineer, appointed mechanical engineer at St. Paul.

E. C. ESTES appointed assistant to mechanical engineer at St. Paul.

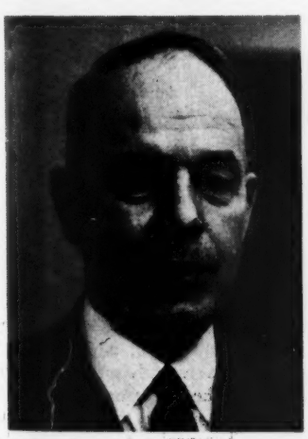
Rutland

LAWRENCE RICHARDSON elected president at Rutland, Vt.

Born: Shelbyville, Ky., on July 11, 1889.

Education: Cornell University (M.E., 1910) and University of Illinois (1908-1909).

Career: Entered railroad service in 1907 as a regular apprentice with the Pennsylvania at Altoona and was with the PRR mechanical department for 10 years. In 1926 became assistant to the chairman of the executive committee, Boston & Maine, and later served successively as assistant to president, mechanical superintendent, chief



Lawrence Richardson

mechanical officer and mechanical assistant to vice-president and general manager. In 1947, appointed mechanical consultant of the B&M and the Maine Central, also assistant general manager of the New York, Susquehanna & Western. In September 1951 joined the Rutland as consultant in the operating and mechanical departments.

Pennsylvania

W. L. THIGPEN, JR., assistant foreman, Paoli, Pa., car shop, appointed assistant foreman, Sunnyside, L. I., car department.

J. K. MCNEAL, gang foreman, Crestline, Pa., enginehouse, appointed assistant foreman, Paoli, Pa., car shop.

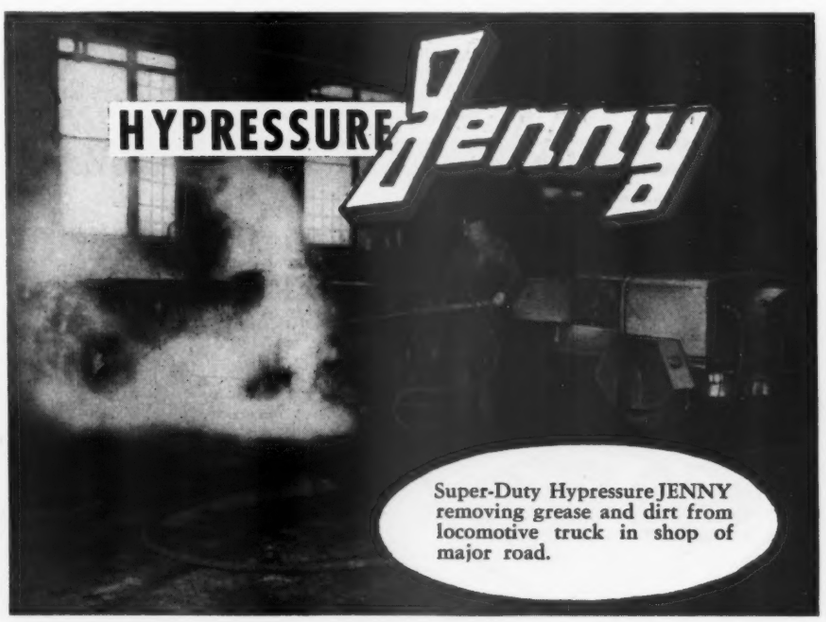
J. E. RICHEY, assistant foreman, Mingo Junction, Pa., car shop, Panhandle division, appointed assistant foreman, Pittsburgh passenger yard, Pittsburgh division.

G. W. CONNER, gang foreman, Derry car shop, Pittsburgh division, appointed assistant foreman, Mingo Junction car shop, Panhandle division.

J. S. HARRIS, enginehouse foreman, Long Island Railroad, appointed assistant foreman, Pitcairn, Pa., enginehouse, Pittsburgh division.

E. R. HALL, gang foreman, Columbus, Ohio, Columbus division, appointed assistant foreman, Canton enginehouse, Eastern division.

R. ZECHLIN, assistant foreman, Clayton, enginehouse, appointed foreman, Atlantic City, N. J., enginehouse.



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Pennsylvania *(Continued)*

J. W. JACKSON, assistant foreman, Sunnyside, L. I., car yard, appointed assistant foreman, Clayton, enginehouse.

J. W. MCLAREN, gang foreman, 28th street enginehouse, Pittsburgh, appointed assistant foreman, Sunnyside, L. I., car yard.

D. S. MCCRACKEN, assistant foreman, Harrisburg diesel shop, appointed enginehouse foreman, Meadows, N. J.

W. E. LUDDY, JR., assistant foreman, first trick. Harrisburg diesel shop, appointed assistant foreman, third trick, Harrisburg diesel shop.

J. W. MCGUIGAN, assistant foreman, Sunnyside, L. I., car department, appointed assistant foreman, first trick, Harrisburg diesel shop.

Seaboard Air Line

L. A. MCCOOK appointed general supervisor car department at Jacksonville, Fla.

Southern

HARVEY E. SOWERS appointed foreman car repairs at Spencer, N. C.

JAMES W. ALLEN appointed foreman electricians at Spencer, N. C.

DENNIS E. HANES appointed assistant foreman enginehouse at Spencer, N. C.

JOHN H. SLOAN appointed foreman electricians, Hayne car shop, Spartanburg, S. C.

GEORGE I. PARRISH appointed foreman enginehouse (night) at Danville, Va.

EDGAR C. CORNWELL, JR., appointed road foreman of engines, Charlotte division, with headquarters at Spencer, N. C.

VERNON G. FAISON appointed road foreman of engines at Spencer, N. C.

Obituary

ALONZO G. TRUMBULL, retired chief mechanical engineer, Advisory Mechanical Committee of the Chesapeake & Ohio, the New York, Chicago & St. Louis, the Erie and the Pere Marquette at Cleveland, died on May 27.

Born: Hornell, N. Y.

Education: Cornell University, 1899 (M.E.)

Career: Entered railroad service in 1902 as engineer of tests of the Erie. In 1903, appointed mechanical engineer; 1905, assistant mechanical superintendent at Meadville, Pa.; 1907, successively, assistant mechanical superintendent, Ohio division, and mechanical superintendent, Ohio division

A. G. Trumbull

and Chicago & Erie; 1912, mechanical superintendent, Erie division; 1914, assistant to general mechanical superintendent; 1919, assistant general mechanical superintendent; 1920, mechanical superintendent, Ohio Region; 1922, chief mechanical engineer, Erie at New York, and 1929, chief mechanical engineer, Advisory Mechanical Committee with headquarters at Cleveland, Ohio. Appointed general mechanical engineer of the Chesapeake & Ohio, the Pere Marquette, and the New York, Chicago & St. Louis in 1945.

Associations: Mechanical Division, A.A.R. (In 1920 chairman of Committee on Modernization of Stationary Boiler Plants and from 1925 to 1928 chairman of Tank Car Committee. Member of the American Society of Mechanical Engineers. (On the Executive Committee of the Railroad Division from 1928 to 1933.)

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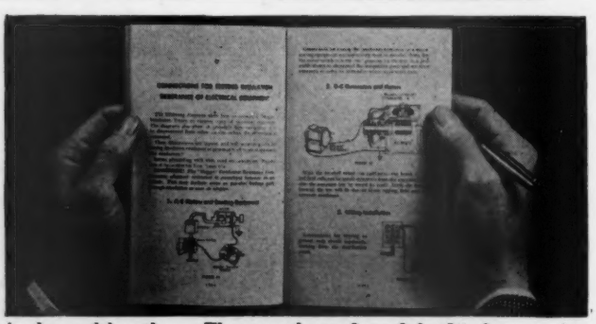

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Air-Maze Corporation 131
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Air Reduction Sales Company (Division of Air Reduction Company, Inc.) 4
American Brake Shoe Company, Brake Shoe and Castings Division 6, 7
American Car and Foundry Company 40, 41
American Locomotive Company 20, 21
American Locomotive Company, Railway Steel-Spring Division 31
American Steel Foundries 15
American Tool Works Co., The 25
Armco Steel Corporation 12

Biddle Co., James G. 128
Black & Decker Manufacturing Company 16
Buffalo Brake Beam Co. 2
Buffalo Forge Company 116
Bullard Company, The 27

California Company, The 111
Cincinnati Grinders Incorporated 56
Columbia-Geneva Steel Division 29
Consolidated Machine Tool Corporation 17

Dayton Rubber Company ..... Back Cover
Dearborn Chemical Company 47
Dow Chemical Company, The 125
Dow Corning Corporation 46
Dreis & Krump Manufacturing Company 123
Duff-Norton Manufacturing Co., The 118

Edison Storage Battery Division of Thomas A. Edison, Inc. 26
Electric Storage Battery Company, The 18
Electro-Motive Division, General Motors Corp. 102, 103
Enterprise Railway Equipment Co. 52
Esso Standard Oil Company 107
Ex-Cell-O Corporation 43

Franklin Railway Supply Company 115

Garlock Packing Company, The 24
General Electric Company 20, 21
General Steel Castings 37
Gould-National Batteries, Inc. 117

Hyatt Bearings Division, General Motors Corporation 28

Independent Pneumatic Tool Co. 121
Ingersoll-Rand 45
International Nickel Company, Inc., The 42

Johns-Manville 34
Johnston Manufacturing Company 126

Kerrigan Iron Works, Inc. 39

Landis Machine Company 32
Lewis Bolt and Nut Co. 129
Libby-Owens-Ford Glass Company 19

Mac-Lean-Fogg Lock Nut Company 13
Magnus Brass Mfg. Co., Subsidiary of National Lead Company 43
Magnus Chemical Company 120
Magnus Metal Corporation, Subsidiary of National Lead Company 10, 11
Met-L-Wood Corporation 55
Miller Felpax Corporation 119
Minnesota Mining & Manufacturing Co. 51
Miner Inc., W. H. 23

National Carbon Company, Union Carbide and Carbon Corporation 113
National Tube Division 29
Nelson Stud Welding Division of Gregory Industries, Inc. 124

Oakite Products, Inc. 3
Okonite Co., The 101
Oxweld Railroad Service Company, Union Carbide and Carbon Corporation 30

(Continued on page 130)

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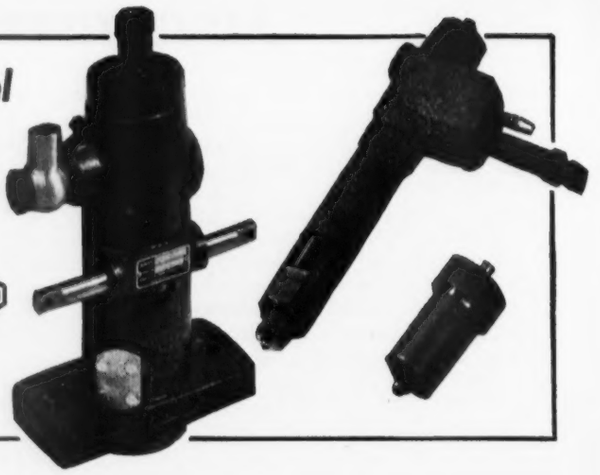

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Pangborn Corp. 126
Pennsylvania Salt Manufacturing Company 105
Punch-Lok Company 112

Railroad Supply and Equipment Inc. 127
Railway Steel-Spring Division, American Locomotive Company 31

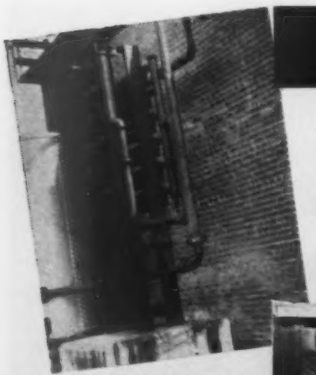
Scullin Steel Co. 33
Simmons-Boardman Publishing Corp. ..123, 127, 128, 138
Simplex Wire & Cable Co. 109
Speer Carbon Co. 50
Spicer Manufacturing Division of Dana Corporation 22
Stackpole Carbon Co. 114
Standard Car Truck Company 49
Standard Oil Company of California 111
Standard Oil Company of Texas 111
Sweeney Mfg. Co., B. K. 52

Texas Company, The 5

Tide Water Associated Oil Company 53
Timken Roller Bearing Company, The 36

Union Carbide and Carbon Corporation, National Carbon Company 113
Union Carbide and Carbon Corporation, Oxweld Railroad Service Company 30
Unit Truck Corporation 2
United States Steel Export Company 29
United States Steel Company 29

Walworth Company 44
Watson-Stillman 35
Westinghouse Air Brake Company 8
Whiting Corporation 14
Williams & Co., J. H. 122
Wilson Engineering Corporation 130
Wine Railway Appliance Company, The .... Front Cover
Wix Accessories Corp. 38



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